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SOLID STATE POLYMERIZATION AND CRYSTALLOGRAPHY OF POLYIMIDE PRECURSORS

A Dissertation

Presented to

the Faculty of the School of Engineering and Applied Science

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In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy (Materials Science)

by

Noel Thomas Wakelyn

May 1974

APPROVAL SHEET

This dissertation is submitted in partial fulfillment of

the requirements for the degree of

Doctor of Philosophy (Materials Science)

Noel Thomas Walker

Author

Approved:

Faculty Advisor

Dean, School of Engineering
and Applied Science

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ABSTRACT

Although the production of crystallinity in a polymeric system has historically led to commerically useful properties, the polyimides, prized for their high temperature characteristics, as customarily synthesized by melt or solution casting, are amorphous. It has been shown that polymide containing residual crystallinity can be synthesized by isothermal annealing of crystals of the salt of the diisopropyl ester of pyromellitic acid and phenylene diamine. The reaction is topochemical in that the geometry of the polymer product is dependent upon that of the crystalline precursor. Infrared spectroscopy reveals the presence of imide absorption in the polymer, while powder diffractometry suggests residual crystallinity. Single crystal x-ray analysis of the monomer yields a structure of chains of alternating acid and base suggesting that the monomer is amenable to polymerization with a minimum of geometrical disruption.

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LIST OF SYMBOLS

Å	Angström unit, 1.0×10^{-10} meter
Ar	aryl, aromatic nucleus
B	temperature factor
C	carbon
°C	degree Celsius; $t_{Kelvin} = t_{Celsius} + 273.16$
cm	centimeter, 1.0×10^{-2} meter (cm^{-1}, wave number)
Cu	copper
δ	delta, a partial charge
E	normalized structure factor
FREL	relative structure factor
g	gram, 1.0×10^{-3} kilogram
H	hydrogen
$hk\ell$	indices of diffracting planes
HOR	alkyl alcohol
K	scale factor
λ	lambda, wavelength, generally expressed in Angström units
micron	1.0×10^{-6} meter
min	minute
ml	milliliter, 1.0×10^{-6} meter^3
Mo	molybdenium
n	n-glide plane
N	nitrogen
Ni	nickel

NMR	nuclear magnetic resonance
R	alkyl group
S2T/L2	$\sin^2\theta/\lambda^2$
θ	theta, angle of incident beam to reflecting plane
2θ	angle of diffracted beam from incident beam
torr	1.33322×10^2 newton/meter^2
Zr	zirconium
2_1	two-fold screw axis

CHAPTER I

INTRODUCTION

The class of main chain aromatic polyimide polymers contains many members of great interest to the researcher and several of growing commercial importance. These materials, which are prized for their superior high temperature and radiolytic properties, derived from their main chain aromaticity[1-4], are produced as films, enamels, fibers, and composites for such varied uses as insulation (for the windings of motors), adhesives, and lubricants. They also find aerospace application as structural materials for light weight, high temperature service.[5-9] Since the imide polymer is usually fabricated in solution from multi-functional and rather bulky monomers, it is normally found in an amorphous state.

In the history of polymer science, the addition of crystalline order (1-, 2-, or 3-dimensional) to a polymeric system has resulted in the improvement of commercially attractive properties such as hardness, toughness, and increased tensile strength as well as increased dimensional stability in the presence of solvents.[10] Procedures varying from the amide "salt process", which produces a crystalline product during polymerization, to post-polymerization

processes such as the calendering of film and drawing of fiber are used to produce such order.

Bell, of the NASA-Langley Research Center, has synthesized a variety of salt precursors of imide and pyrrone polymers, based upon the earlier amide salt process and has succeeded in establishing a novel route for obtaining a variety of heteroaromatic polymers formed through a polyamide stage.[12] It occurred to him, since the precursors appeared crystalline, that several of them might provide possible routes for obtaining main chain aromatic polymers in the crystalline state. Single crystals of trioxane have been polymerized in the solid state to polyoxymethylene with oriented chains.[13,14] A variety of ring monomers have been subjected to radiation polymerization and were converted to linear polymers by a ring opening mechanism in the solid state, with properties which suggest the imposition of the monomer orientation and order upon the polymer structure.[15]

Crystalline organic compounds have been observed to undergo "topochemical"[16] reactions in which the process is dependent upon the geometrical relationships of the reacting groups such that not only is reaction in the liquid state different in rate and/or product from reaction in the solid state but different polymorphic forms of the same compounds can display different chemistry.[17] While one

would suppose that the production of polymerization by-products would disrupt the crystalline order of the reacting molecular matrix as they traveled to the surface, topotactic condensation polymerization has been observed. For example, the cyclization of phthalanilic acid, with the elimination of water, is reported to be topotactic.[17] The essential characteristic of topotactic polymerizations appears to be the minimization of thermal motion to that actually required for the linking up of the monomer molecules.[18]

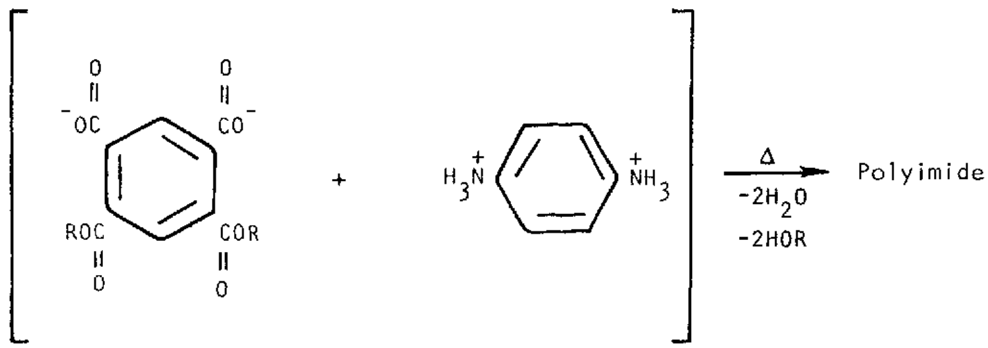
If one could polymerize a crystalline pre-imide precursor in the solid state at a temperature at which the minimum molecular motion to achieve the imide linkage occurs, there is the possibility that the polymer would display at least part of the crystal structure of the starting material and a crystalline aromatic polyimide would be achieved. Along with the possibility of enhanced physical properties there is the chance of gaining enough chemical and physical understanding of the process such that one could move toward the long term goal of the synthetic chemist of being able to tailor desired properties into his constitutions of matter. Be that as it may, solid state polymerization holds out the possibility of constraining an array of molecules in a known and perhaps desired position until they react.

The goal of this research is the achievement of polyimide polymer, possessing residual crystallinity, by the annealing of a pair of crystalline precursors in various ways, for varying periods of time, and at various temperatures. A variety of analytical tools have been used in the attempt to characterize the materials, before and after annealing, in an effort to determine what they are, what they become, and the geometrical and physical paths taken.

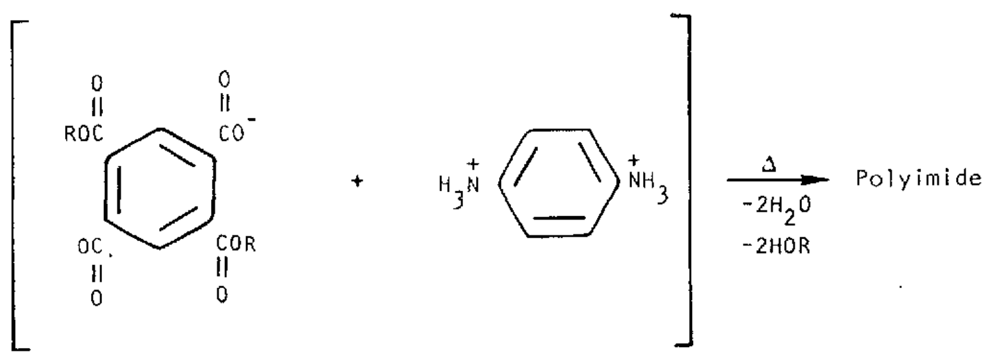
CHAPTER II

SOLID STATE POLYMERIZATION

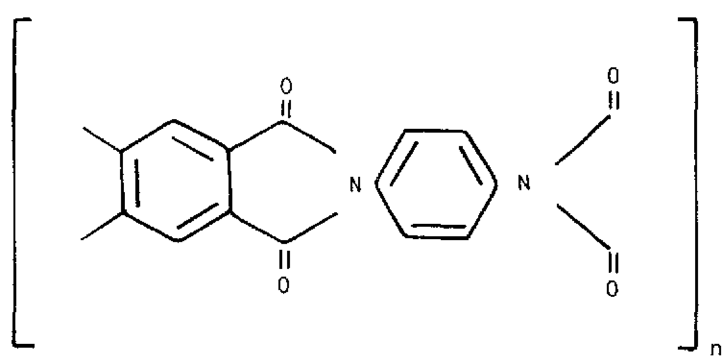
In order to ascertain the possibility of synthesizing crystalline polyimide polymer in the solid state and perhaps gaining insight into any topochemical constraints as well as achieving mechanistic understanding, such as the involvement of an amide stage, it was decided to isothermally anneal these salt precursors(called salts by analogy to the earlier amide work) at the lowest possible temperature required to generate polymer. It was thought that more highly crystalline polymer could be achieved at the lowest temperatures, in which molecular motion is minimized to that actually required for the formation of the imide linkage without destroying the crystalline order present in the salts, or, at least to maintain some of that order in the polymer. It was recognized that this could involve prolonged annealing times. To discern the lowest possible temperature and the required times, various temperatures and times were used until a data assemblage was generated with temperature varying in 10° C increments from 120 to 170° C and annealing times varying from 1 day to 1 week. Both open and sealed specimen containers were used. The overall reaction for the production of polyimide from isomeric salt is idealized in Figure 1.



(a) Meta salt.



(b) Para salt.



(c) Polyimide.

Figure 1.- Salt polymerization reactions. (R = isopropyl functional group.)

The starting materials used in this study were a pair of "salt" precursors of imide polymers synthesized from phenylenediamine and an isomeric pair of diacid diisopropyl esters of pyromellitic acid, separated by fractional crystallization and characterized by NMR. The materials, presumed to be ammonium salts, can be named 1,4-phenylenediammonium 4,6-dicarboisopropoxy-1,3-benzenedicarboxylate (termed the meta isomer and present in the form of pale pink needles) and 1,4-phenylenediammonium 3,6-dicarboisopropoxy-1,4-benzenedicarboxylate (termed the para isomer and present in the form of pale pink platelets). Commercial analysis yields:

	Calculated % $C_{22}H_{26}N_2O_8$	Found % Meta	Found % Para	Calculated % Monohydrate
Carbon	59.19	58.88	58.42	56.89
Hydrogen	5.87	5.87	5.94	6.08
Oxygen	28.69	29.03	29.95	31.00
Nitrogen	6.27	6.15	6.13	6.03

These data suggest the possibility of hydration of the para isomer, with less than 1 water/unit cell.

The X-ray powder diffractograms of Figure 2 show the amorphous characteristics of the polyimide produced by solution casting along with the crystalline patterns of the

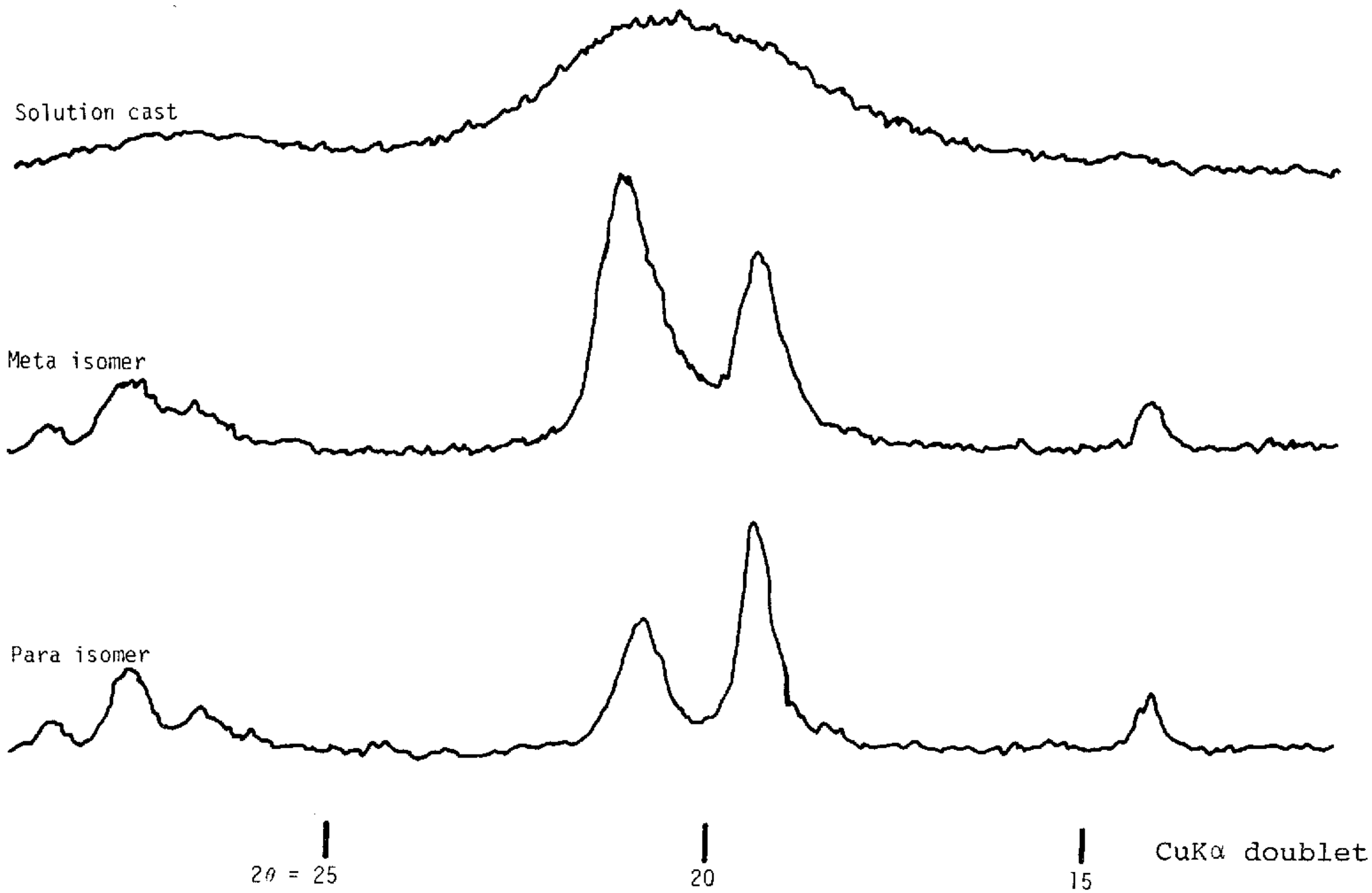


Figure 2.- X-ray powder diffractograms of amorphous solution cast polyimide and crystalline isomeric starting material.

two salt precursors. Both salts should in time transform into the same polymer but perhaps by utilizing different routes and under different conditions produce polymer in a different geometrical form. It was supposed that the polymer produced by solid state polymerization will have a powder pattern intermediate between the crystalline patterns and that of the solution cast material.

The annealing was accomplished in a vacuum oven, modified by the installation of a massive aluminum block into which specimen receiving holes had been cut and with thermocouples placed in the region of specimen residence. It was found that the temperature of the interior of the block could be maintained to within better than $1^{\circ}C$ for periods up to a week. The interior of the oven was subject at all times to out-gassing by the action of an oil diffusion vacuum pump which maintained a pressure in the range of 1 torr. The usual procedure for the insertion of a specimen involved the attaining of the desired temperature, its maintenance for sufficient time to insure that it was in true equilibrum for the conditions, breaking of the vacuum and rapid implacement of an open tube containing the preweighed specimen, followed by the closing of the oven and reestablishment of the vacuum. The mass of the container and specimen is insignificant compared to that of the aluminum heat

sink. Typically a temperature decline of 2°C from that desired was measured for the first half hour following the insertion of a specimen. The succeeding 5 hours of a test would be conducted at 1°C lower than desired, the desired temperature being reached and maintained thereafter.

It was recognized that any weight change information would be obscured, at least for the higher temperature tests, by loss of material other than the product water and alcohol due to the combination of increased temperature and lowered pressure. Therefore sealed tube specimens were annealed as duplicates for some of the higher temperature, longer time, tests. Specimen and container were sealed in a tube after room temperature outgassing for two days under a vacuum-ion pump with a manifold pressure of 3×10^{-7} torr as measured by ion gage. Typically the bottom of the tube would be at 5×10^{-6} torr during the outgassing procedure. PET* film sealed in a similar manner established a pressure of 1×10^{-2} torr within the sealed tube.

The course of polymerization was followed for the various times and temperatures, for the two isomeric salts, in open and sealed tubes, by measurement of weight change, differential thermal analysis, infrared spectrometry, and powder diffractometry.

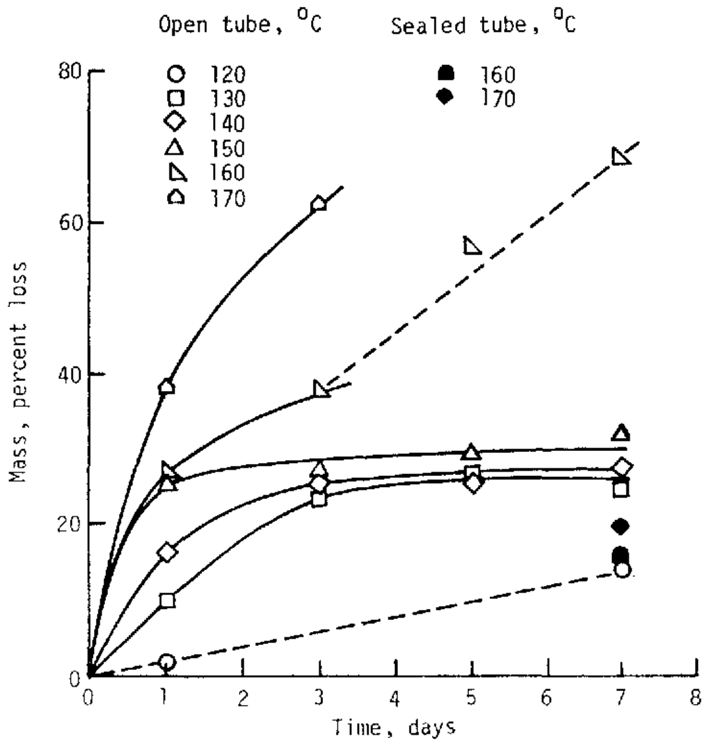
*Poly(ethylene terephthalate)

CHAPTER III

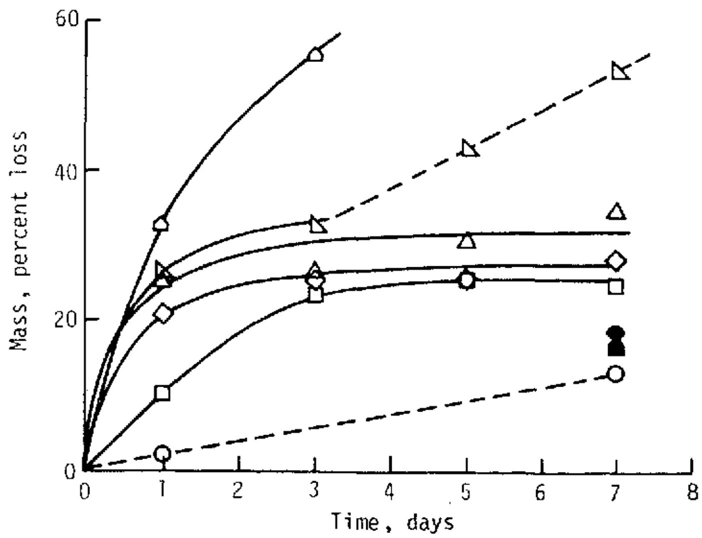
RESULTS AND DISCUSSION

Weight Change. The complete reaction from the salts of the diacid diisopropyl esters of pyromellitic acid and phenylenediamine, with the loss of 2 moles of water and 2 moles of isopropyl alcohol per mole of salt to produce the polyimide polymer, would result in the loss of about 35% of the mass of the specimen. Figures 3(a) and 3(b) display the percent loss of mass as a function of time for the isothermal annealing, at the various temperatures and containment conditions, of the meta and para isomers, respectively.

The weight change data of the two isomers are similar, with the 150^{o}C annealings leveling with time slightly below the 35% complete reaction line. After 1-3 days at temperatures above 150^{o}C, for the open tube specimens, there is material loss higher than that required for complete reaction indicating loss of reactant material. Sealed tube specimens were annealed in an attempt to obtain data covering the higher temperature, longer time, annealings without reactant material loss. These produce percent weight losses between the 120-130^{o}C open tube cases for the 160-170^{o}C sealed tube cases. Of course, the presence of water/alcohol above the polymerizing material should tend to establish an equilibrium condition rather



(a) Para Isomer.



(b) Meta Isomer.

Figure 3.- Percent mass loss vs. time for isothermal annealing.

far removed from complete polymerization. There is, in general, increased loss with temperature and increased loss with time until about 3 days, at which time reaction involving water/alcohol loss is substantially complete.

Linear regression analysis of the percent weight loss data versus the square root of time in hours yields an adequate linear relationship for the para and meta, 130°C, specimens up to 120 hours. For the equation, $y = a + bx$:

	PARA	META
a	-0.3653	-0.4757
b	2.513	2.532
SAMPLE CORRELATION COEFFICIENT	0.9864	0.9884
STANDARD ERROR OF ESTIMATE	1.722	1.603

The implication is that the reaction in this low temperature range is diffusion controlled and that a parabolic diffusion law is governing.

Differential thermal analysis. Differential thermal analysis thermograms were taken of each of the annealed specimens with a DuPont Model 900 instrument using a programmed heating rate of 10° C/min. and standard glass beads as a reference. Tracings of the 120°C open tube annealed specimen thermograms, comparing the para and meta isomers

for the 24 and 168 hour annealings, are displayed in figure 4. Figures 5(a) to 5(e) display tracings of the DTA thermograms of the open tube annealings of the para isomer from 130 to 170°C, respectively. Figures 6(a) to 6(e) display tracings of the DTA thermograms of the open tube annealings of the meta isomer from 130 to 170°C, respectively. Figure 7 displays tracings of the DTA thermograms of the para and meta sealed tube specimens. Comparison of the magnitudes of endothermic absorption is possible on the same curve but not between different curves. The temperature of an endotherm is directly comparable for all curves.

The DTA data of Figures 4-6 appear to be a series of single or double fusion endotherms. Such is not the case. In the usual melting point determination in which the specimen is inspected visually as the temperature is increased no melting is observed to occur for either annealed or unannealed specimens. At 100-105°C the unannealed para specimen appeared to try to melt in that it in part assumed the shape of the capillary tube and in part shrunk away from the tube and appeared to shimmer, without actually melting. Near 150°C, both isomers underwent faint color changes toward red. Near 175°C, the para isomer appeared to have crystallized in the sense that it had the grainy appearance of a crushed inorganic. At this temperature, the meta isomer was

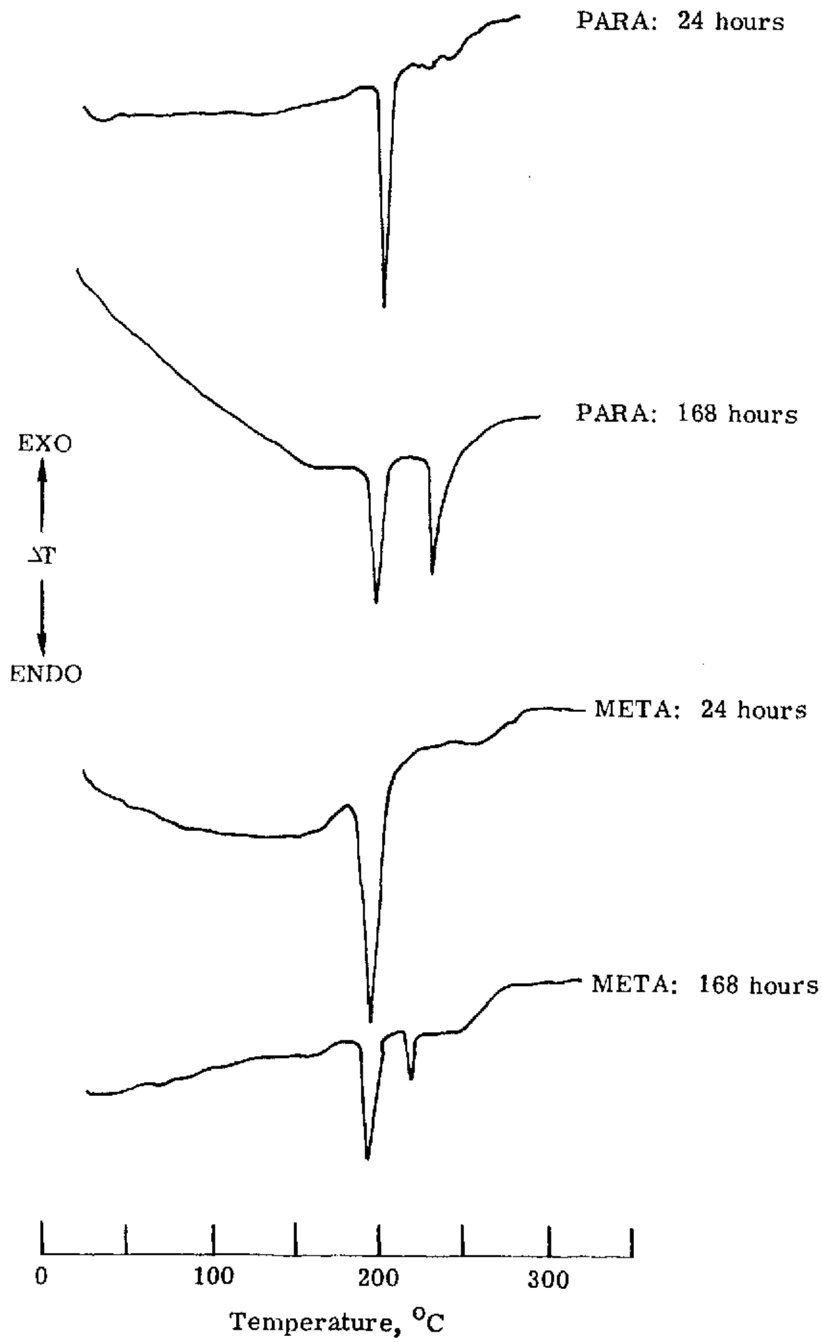


Figure 4.- DTA thermograms of PARA and META open tube specimens annealed at 120°C.

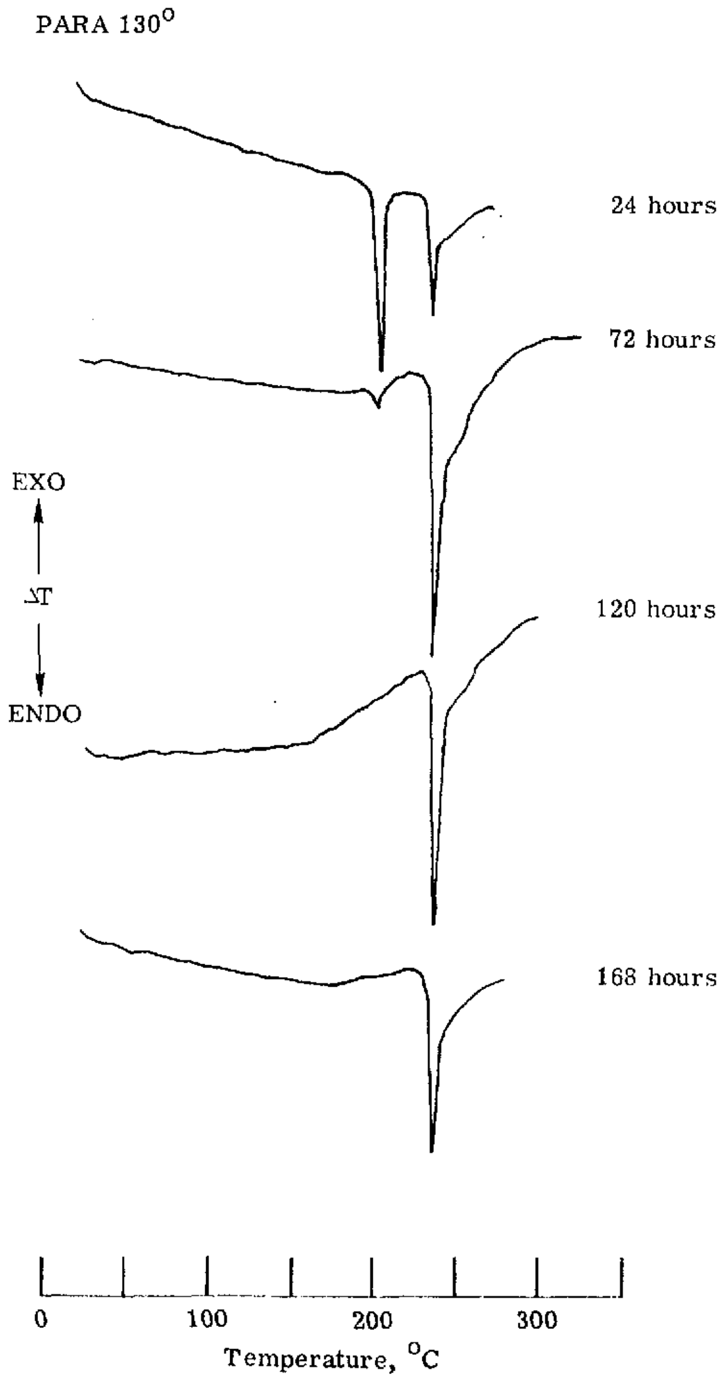


Figure 5(a).- DTA thermograms of PARA open tube specimens annealed at 130°C.

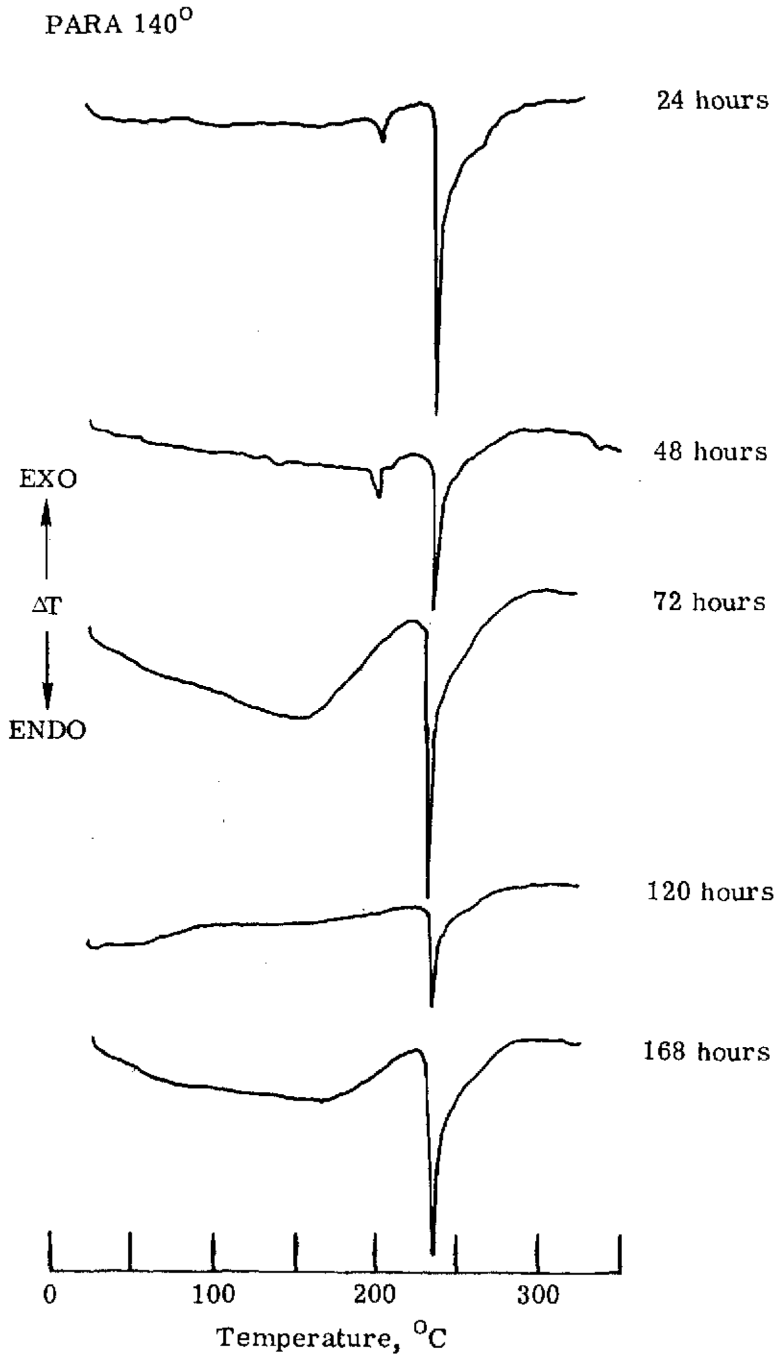


Figure 5(b).- DTA thermograms of PARA open tube specimens annealed at 140°C.

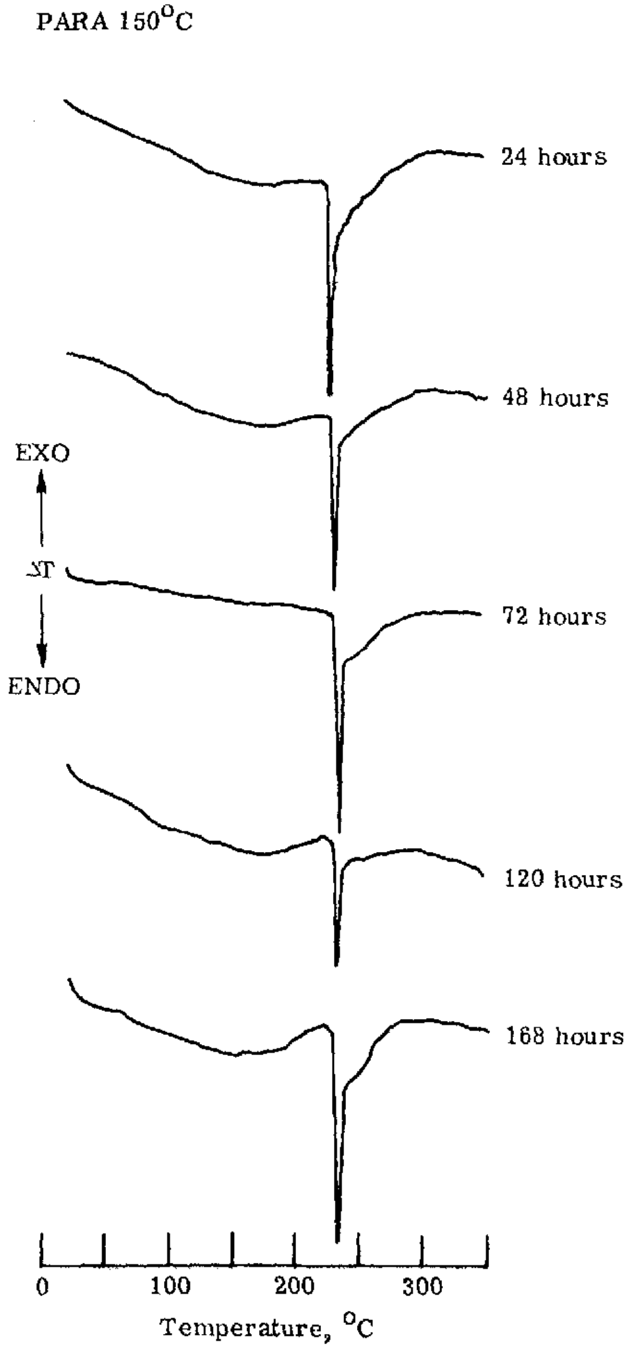


Figure 5(c).- DTA thermograms of PARA open tube specimens annealed at 150°C.

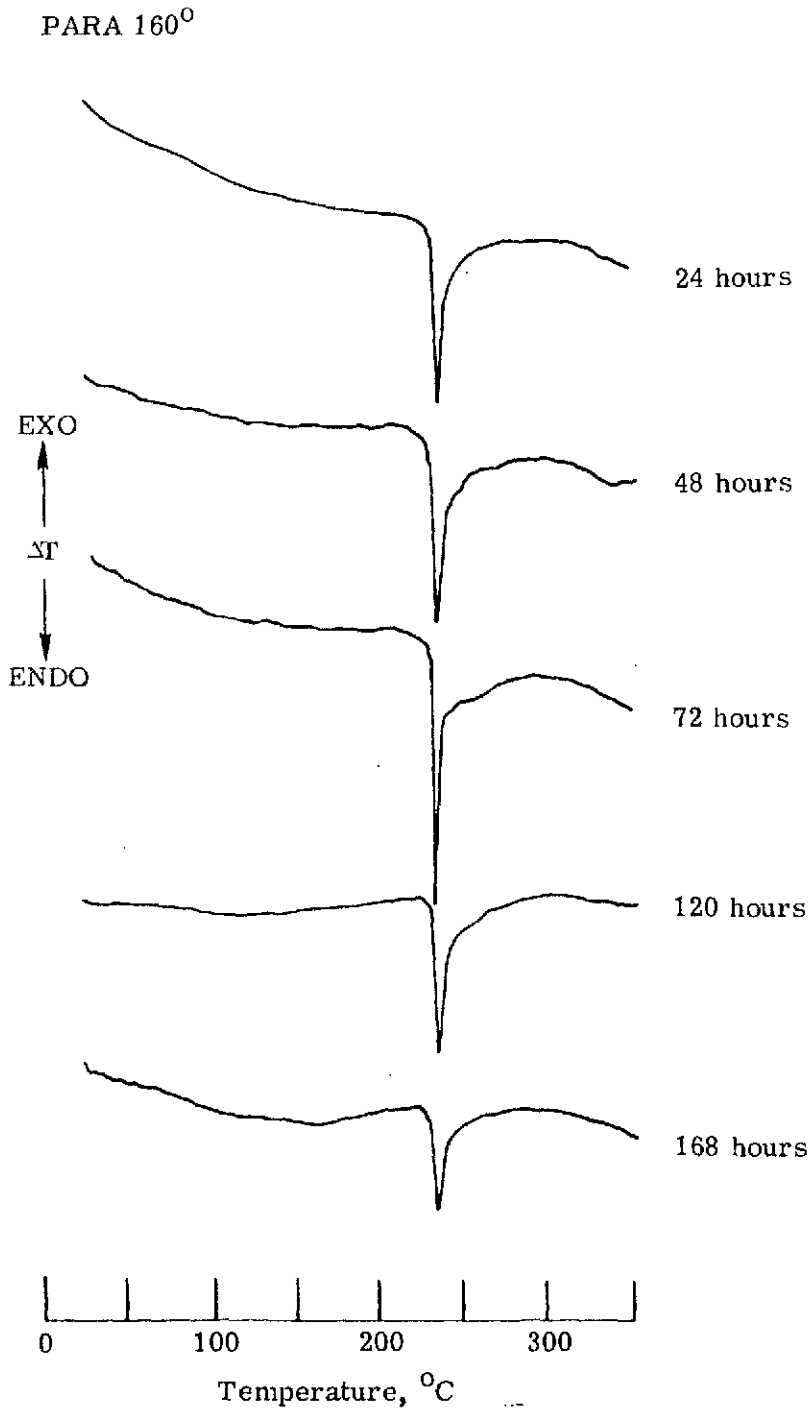


Figure 5(d).- DTA thermograms of PARA open tube specimens annealed at 160°C.

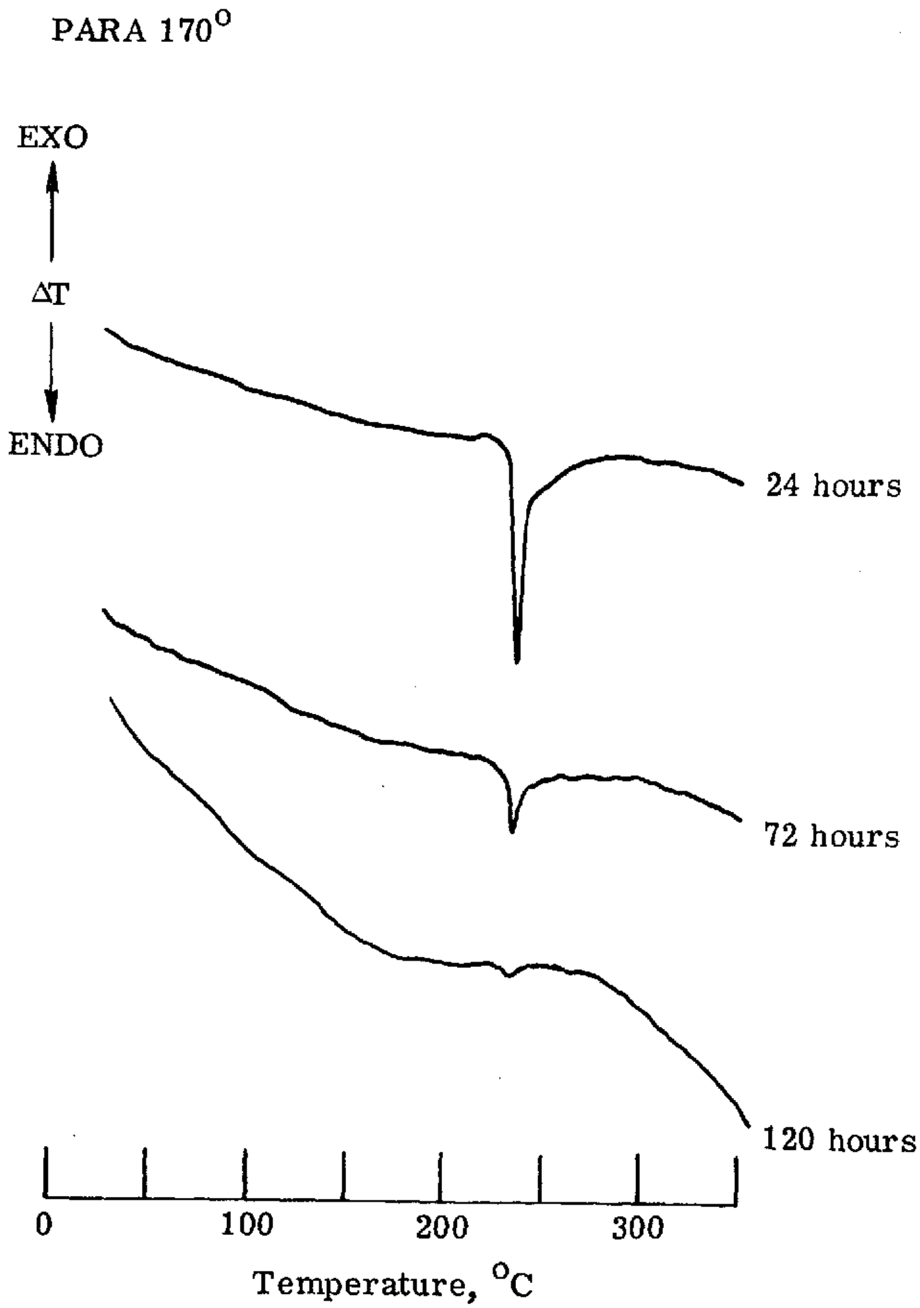


Figure 5(e).- DTA thermograms of PARA open tube specimens annealed at 170°C.

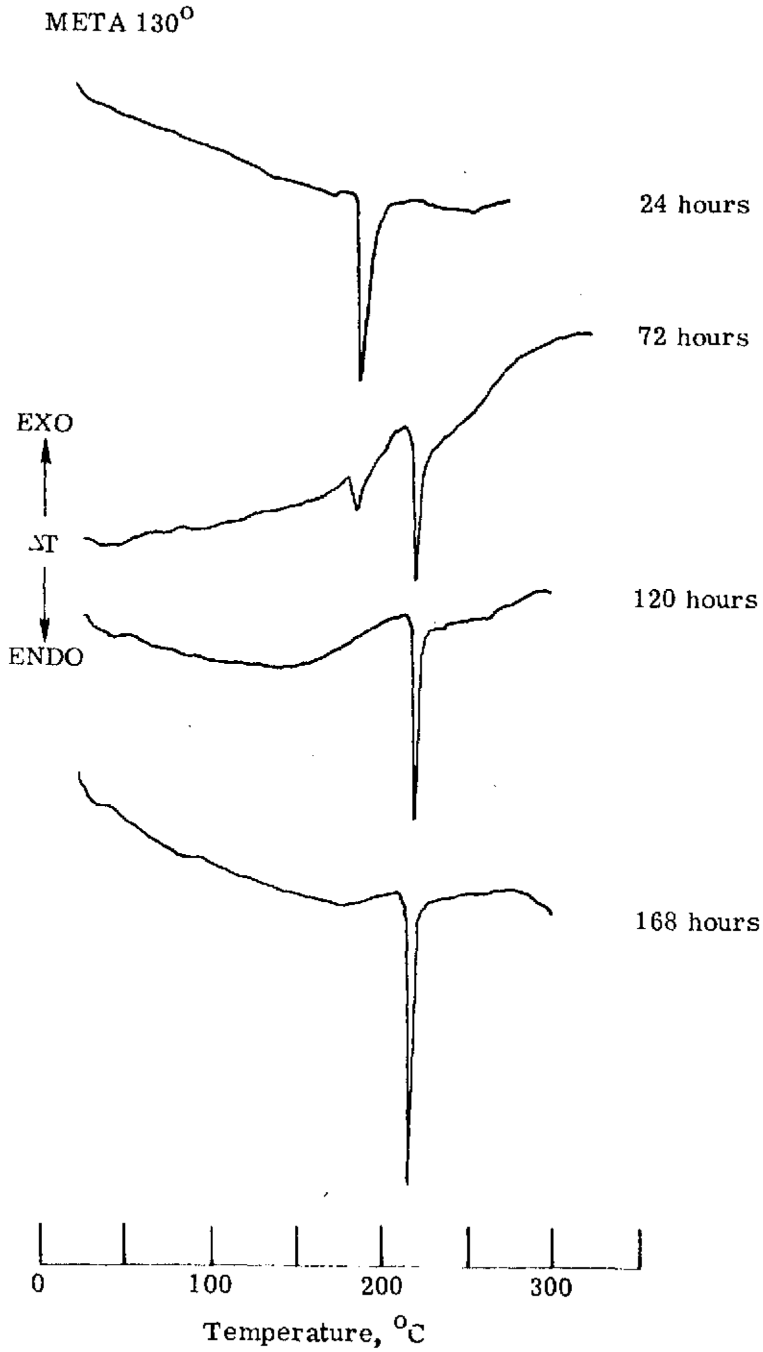


Figure 6(a).- DTA thermograms of META open tube specimens annealed at 130°C.

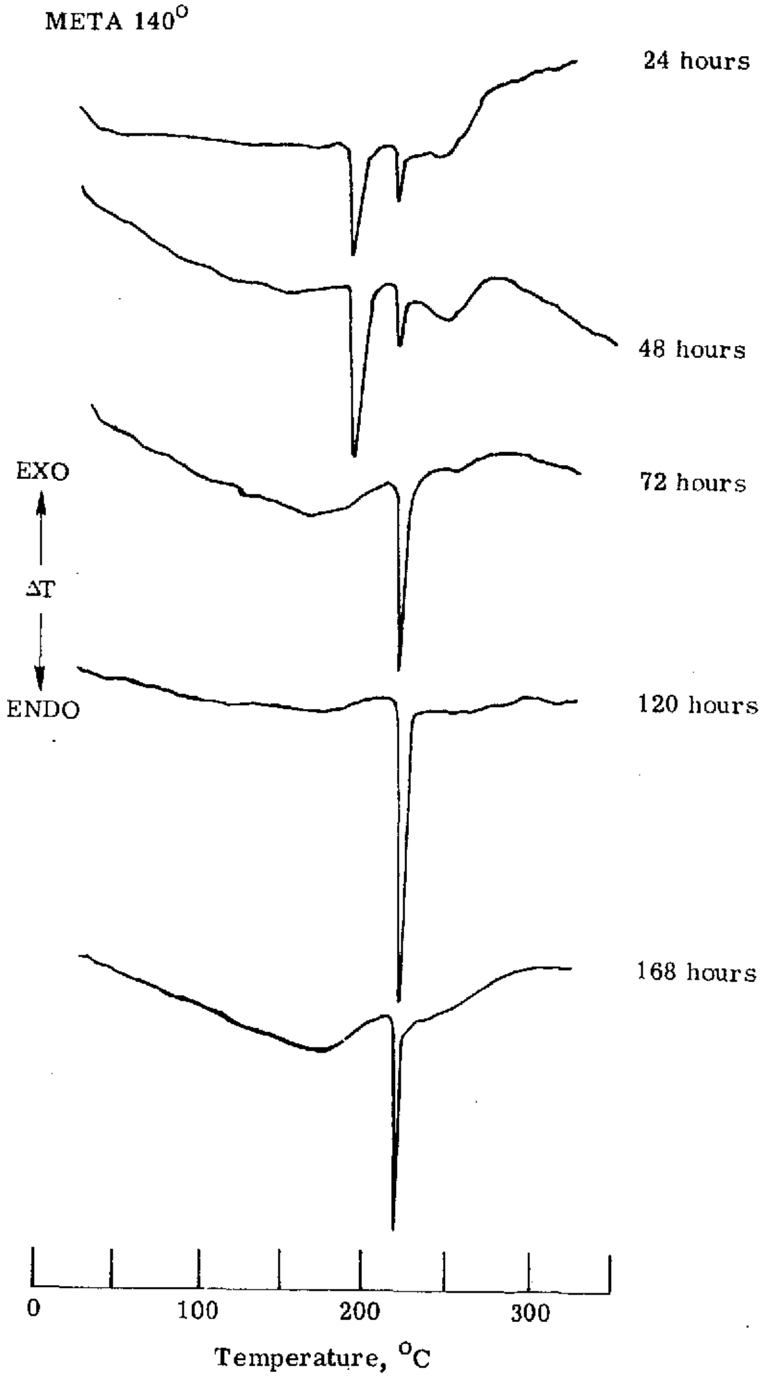


Figure 6(b).- DTA thermograms of META open tube specimens annealed at 140°C.

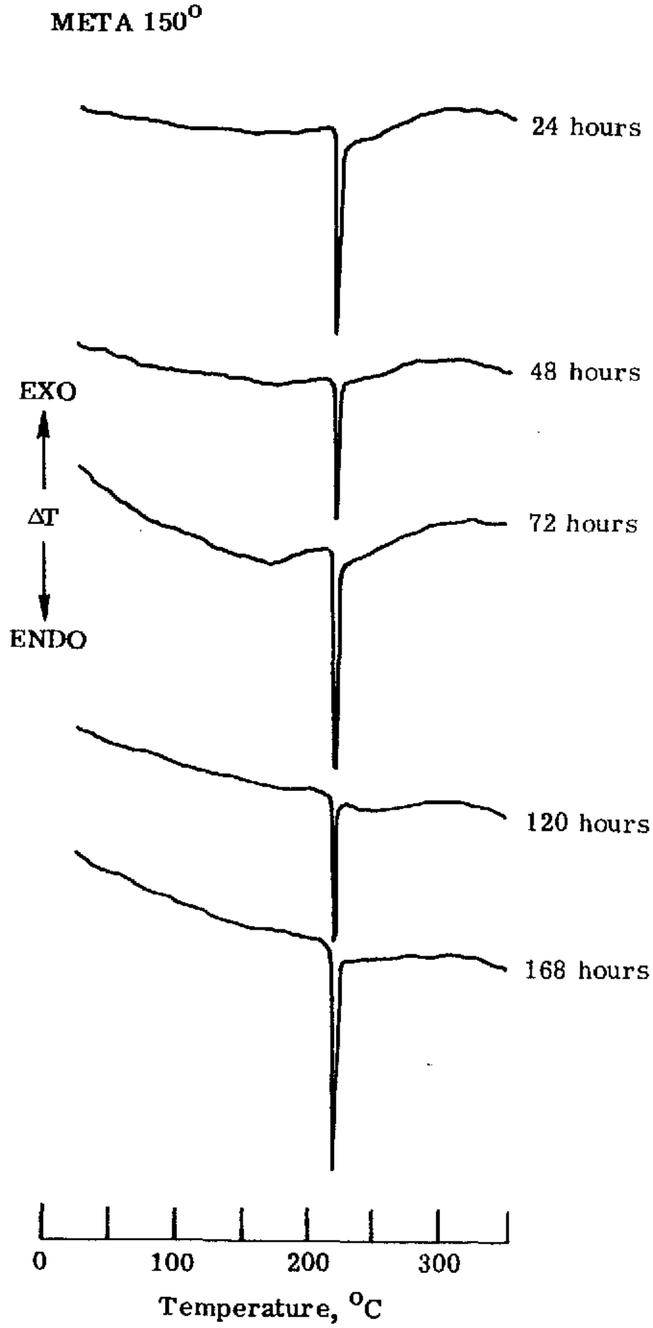


Figure 6(c).- DTA thermograms of META open tube specimens annealed at 150°C.

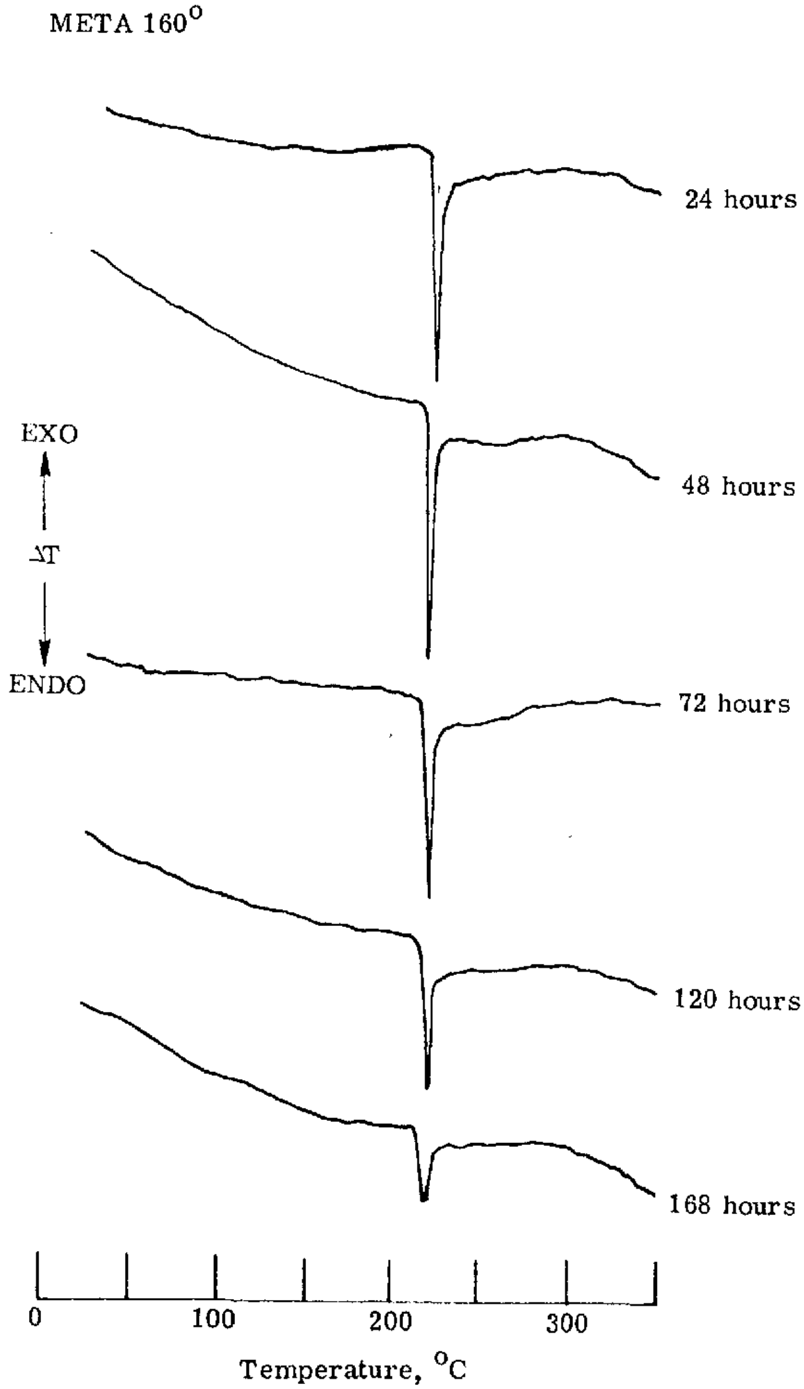


Figure 6(d).- DTA thermograms of META open tube specimens annealed at 160°C.

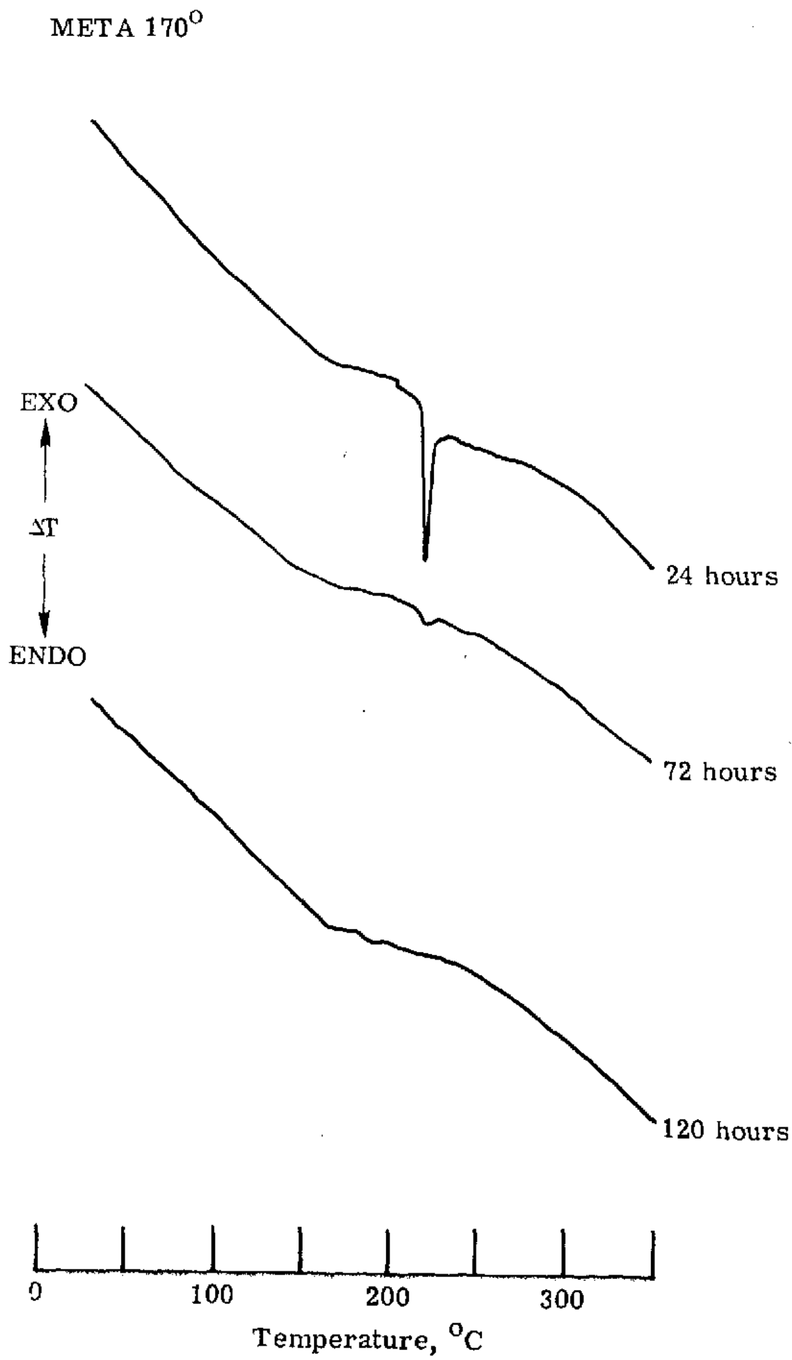


Figure 6(e).- DTA thermograms of META open tube specimens annealed at 170°C.

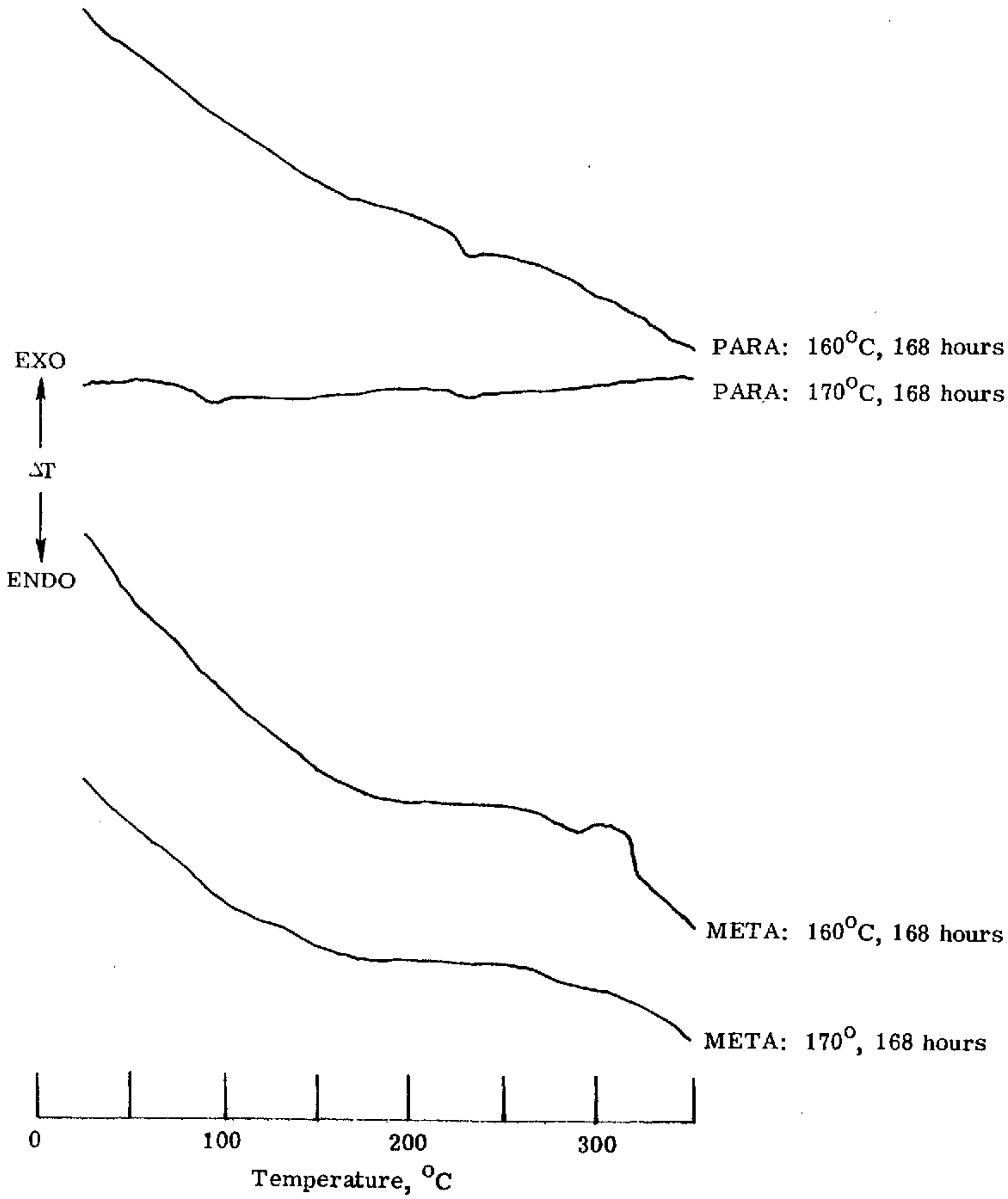


Figure 7.- DTA thermograms of PARA and META sealed tube specimens.

a brilliant deep red. At 190°C, both isomers were a rust brown. Above 190°C, the meta isomer had the appearance of a hard irregularly shaped, chunky material while the para filled the tube and had a porous appearance.

The DTA thermogram of the unannealed para isomer is characterized by 1 endotherm whose minima occurs slightly above 200°C while the unannealed meta isomer, also displaying 1 endotherm, has its minima slightly below 200°C. An attempt at an instant melting point, in which the material is deposited upon a stage which has been preheated to the desired temperature, leads to melting with decomposition at ca. 200°C for both isomers, followed by solidification. Melting with decomposition is defined as a frothy melt with evident evolution of gas and change in color. The pale pink crystals produced a red frothy liquid which immediately changed to a brown solid.

The para isomer, when heated for 24 hours at 120°C, displayed a major DTA endotherm near 205°C with a slight indication of a second endotherm at 235°C. After 168 hours at the same temperature the DTA produces 2 endotherms, one at near 205°C and another at near 235°C, the lower temperature endotherm being of slightly greater magnitude. See figure 4. The 24 hour, 120°C, meta case produces one major endotherm near 197°C, while the 168 hour specimen, 120°C,

produces two endotherms, one near 195°C and another near 220°C, the lower temperature endotherm being 2-3 times the size of the higher temperature one. Since melting is not occurring at this lowest annealing temperature, it is assumed that 2 solid state transitions are occurring for each isomer, the second transition, at the higher temperature in each case, being possible only after prolonged annealing has produced enough change in the material. The change that allows the second transition to proceed is assumed to be indicated by whatever is producing the first endotherm.

Since there are 2 transitions and 2 gaseous products involved in the polymerization, one might tend to associate a transition with the endothermic production and evolution of gas. However, model compound studies of similar materials, same diacid-diester but with tetrafunctional amines, have shown the elimination of water and alcohol to occur simultaneously.[19] The previously cited work and another[12] indicate that meta-oriented salt intermediates react to produce polymer at slightly lower temperatures than para intermediates in accord with present finding of the relative positions of the lower temperature endotherms.

Infrared spectra (unannealed). The meta and para isomers contain a variety of infrared active functional groups which can in various ways interfer with each other to obscure the interpretation of the respective spectra.

In addition to the presence of the aromatic rings and the two isopropyl ester moities there are the following possibilities:

(a) 2 amino + 2 carboxyl groups

(b) 1 amino + 1 ammonium + 1 carboxyl + 1 carboxylate

(c) 2 ammoniums + 2 carboxylates

In addition to harmonic interactions between the various bands there are band shiftings due to both inter and intramolecular hydrogen bonding and interactional effects produced by proximity of groups relative to each other and related to the internal geometry of the respective unit cells of the crystals.

The supposed polymerization of the salts by long term isothermal annealing would tend with time to remove the amino, ammonium, carboxyl, and carboxylate bands (or any combination thereof) and produce bands representative of the imide linkage. The present IR spectra, taken with both the Perkin-Elmer 137B and the PE-421 utilizing the KBr disk method includes the original, unannealed specimens (Figures 8a and 8b), the open tube para specimens, function of time at specific annealing temperatures (Figures 16-21), the closed tube meta specimens at two different temperatures (Figure 22), specimens of the materials from which the salts were made (Figure 23), specimens of solution made polymer (Figure

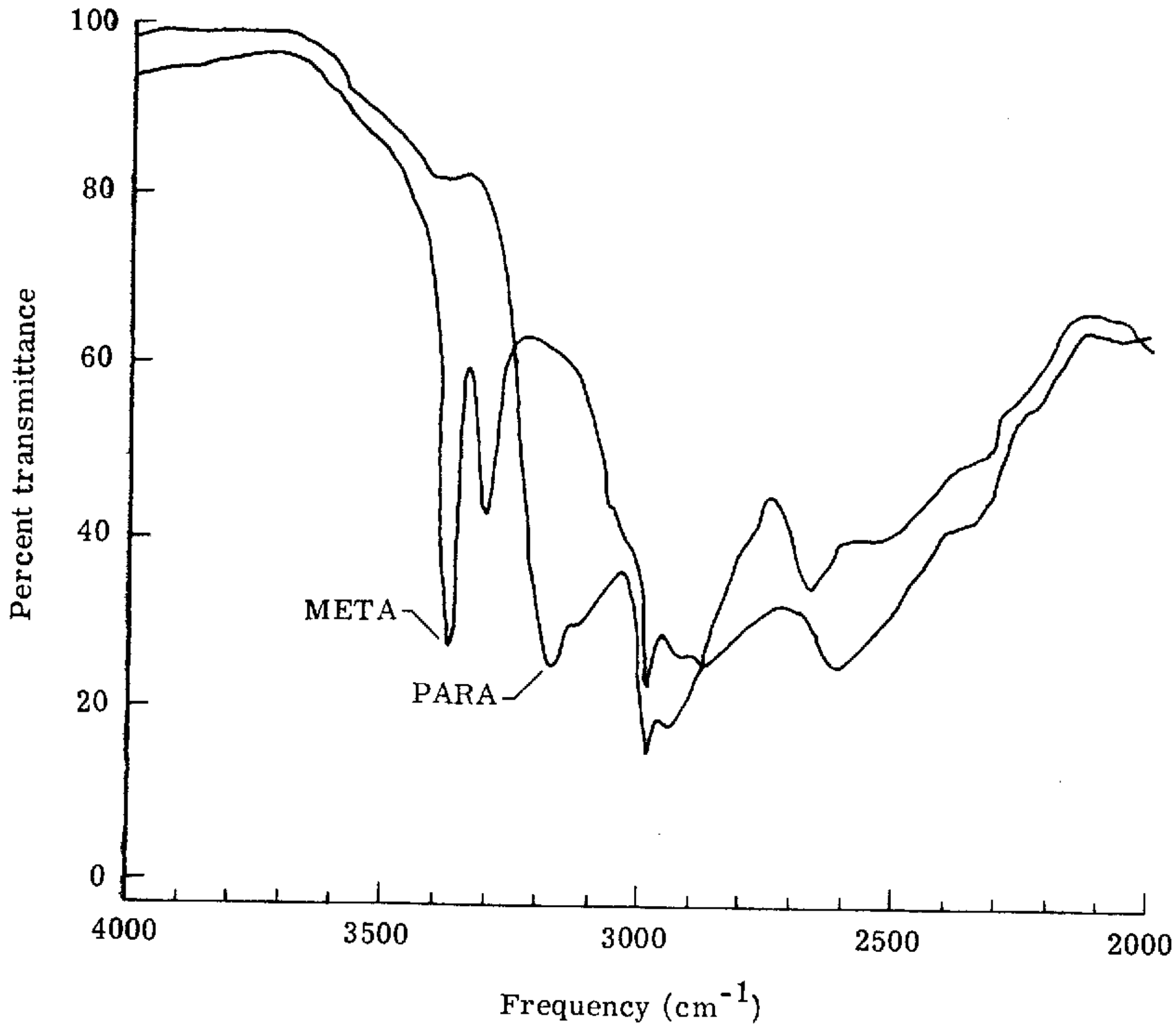


Figure 8(a).- Infrared spectra of untreated META and PARA isomers.

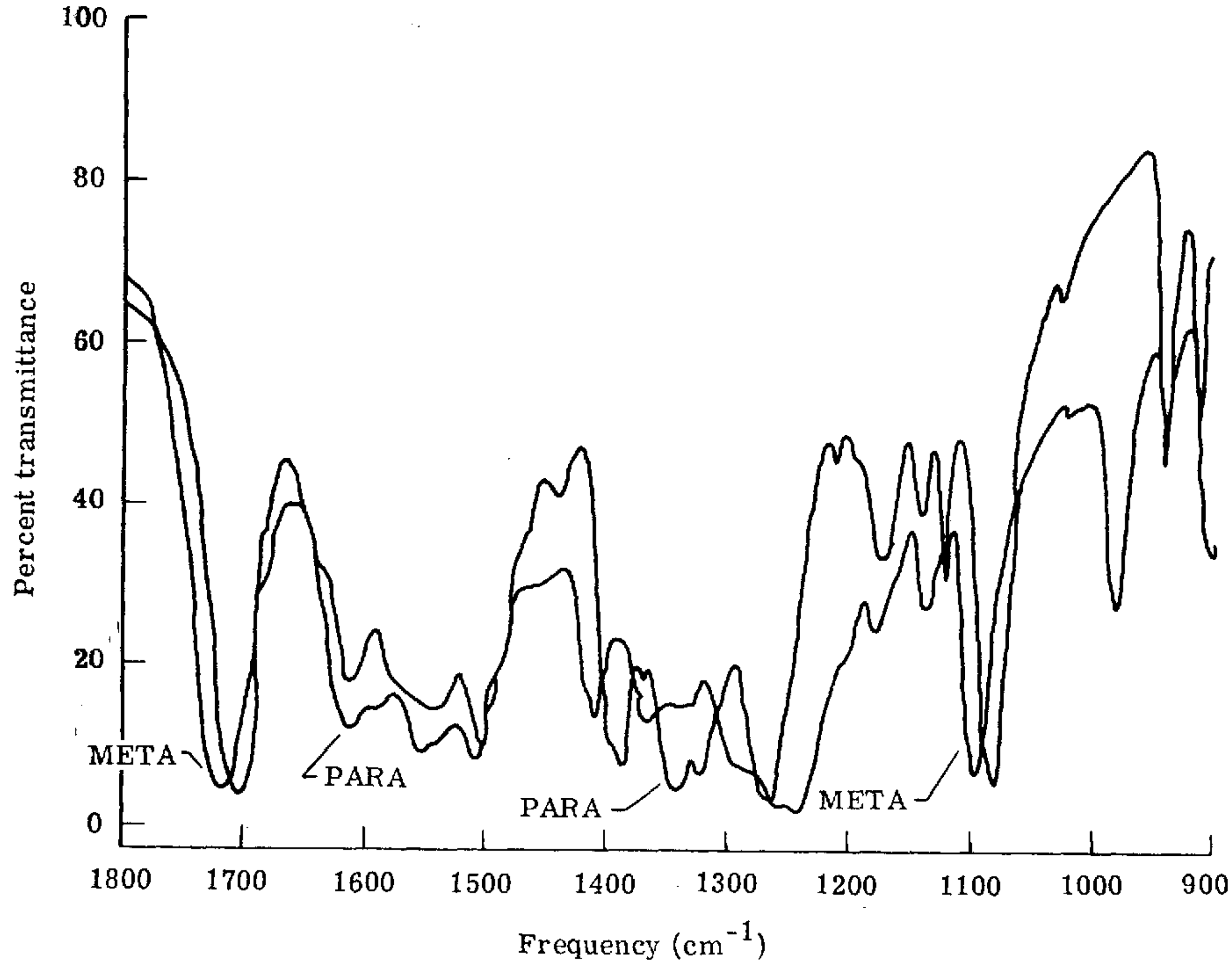
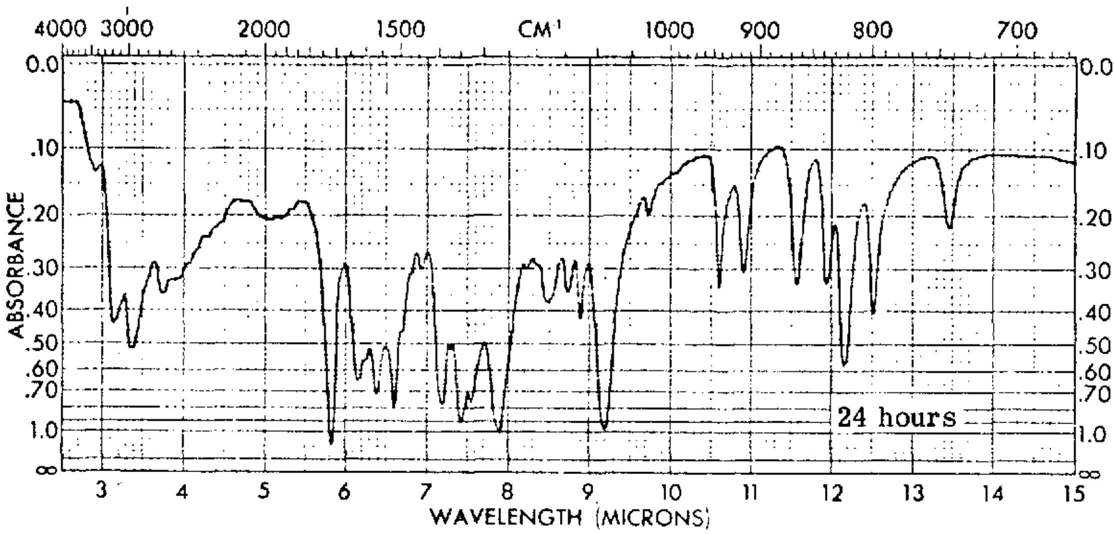


Figure 8(b).- Infrared spectra of untreated META and PARA isomers.



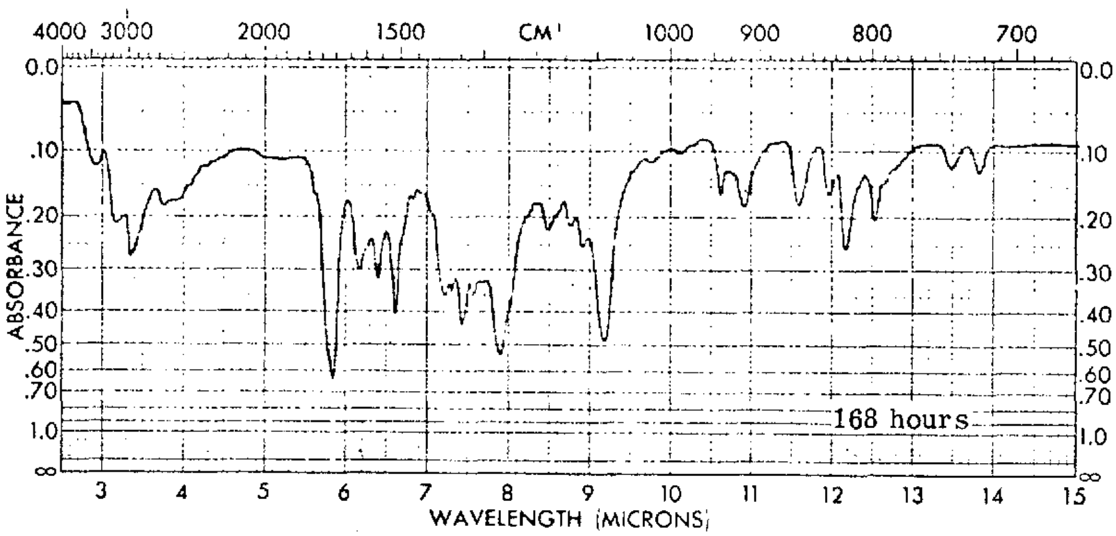
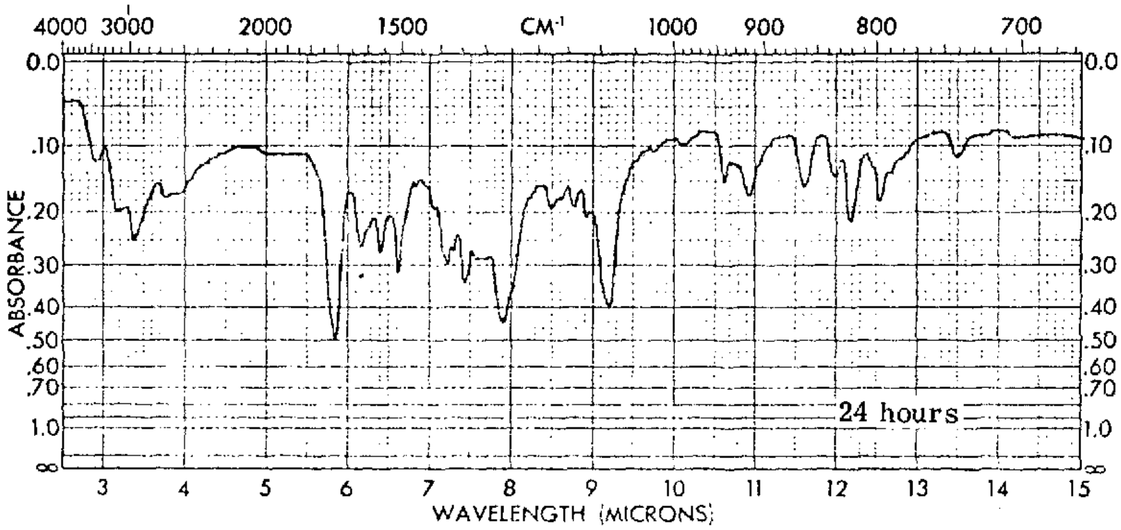


Figure 9.- Infrared spectra of PARA open tube specimens annealed at 120°C.



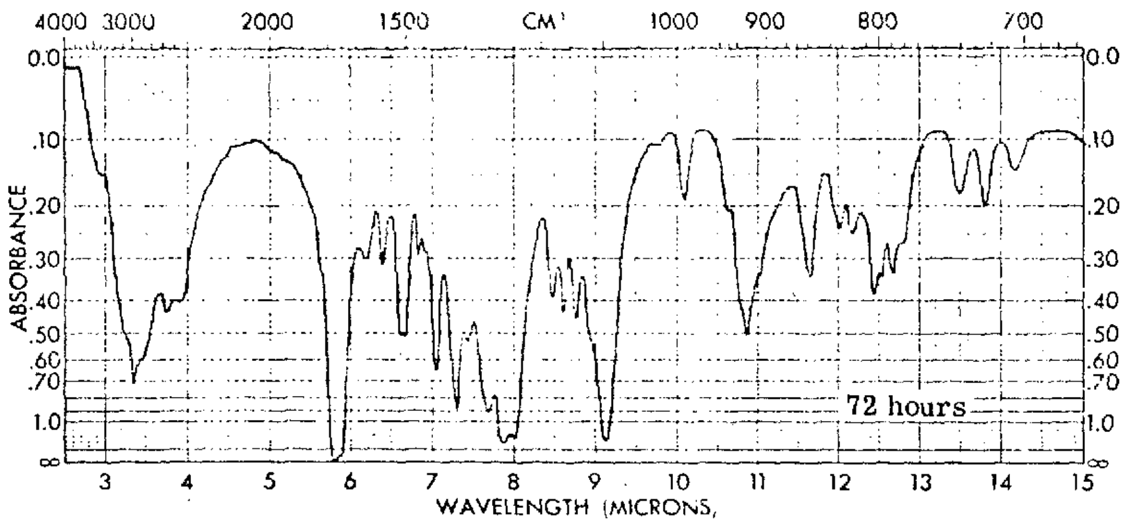
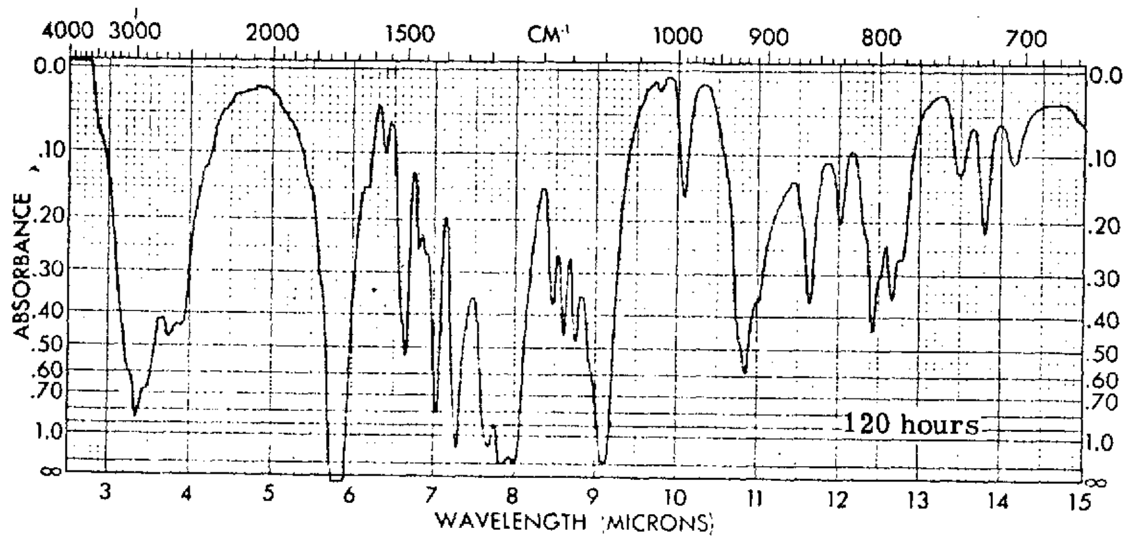


Figure 10(a).- Infrared spectra of PARA open tube specimens annealed at 130°C.



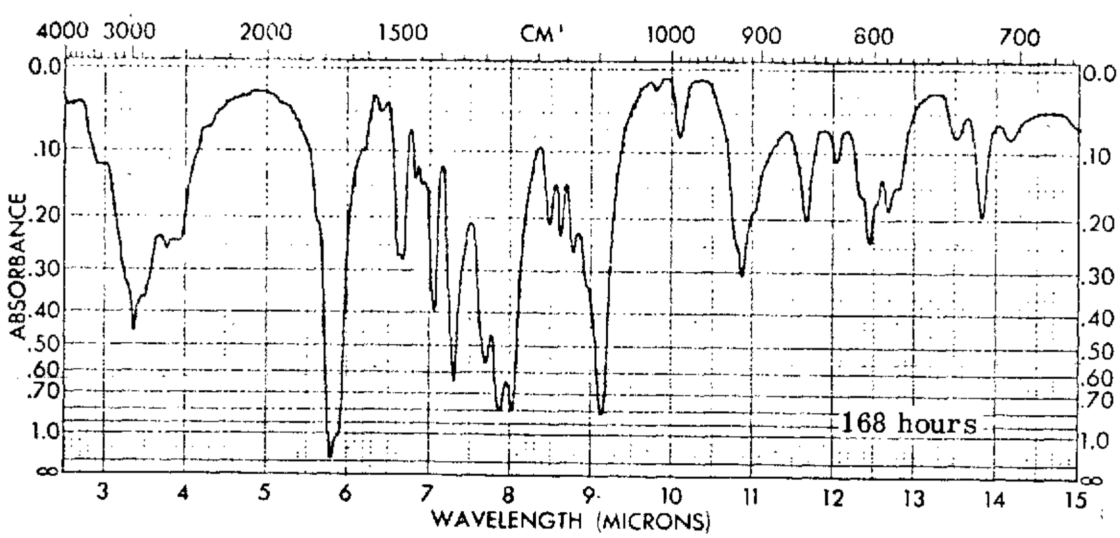


Figure 10(b).- Infrared spectra of PARA open tube specimens annealed at 130°C.

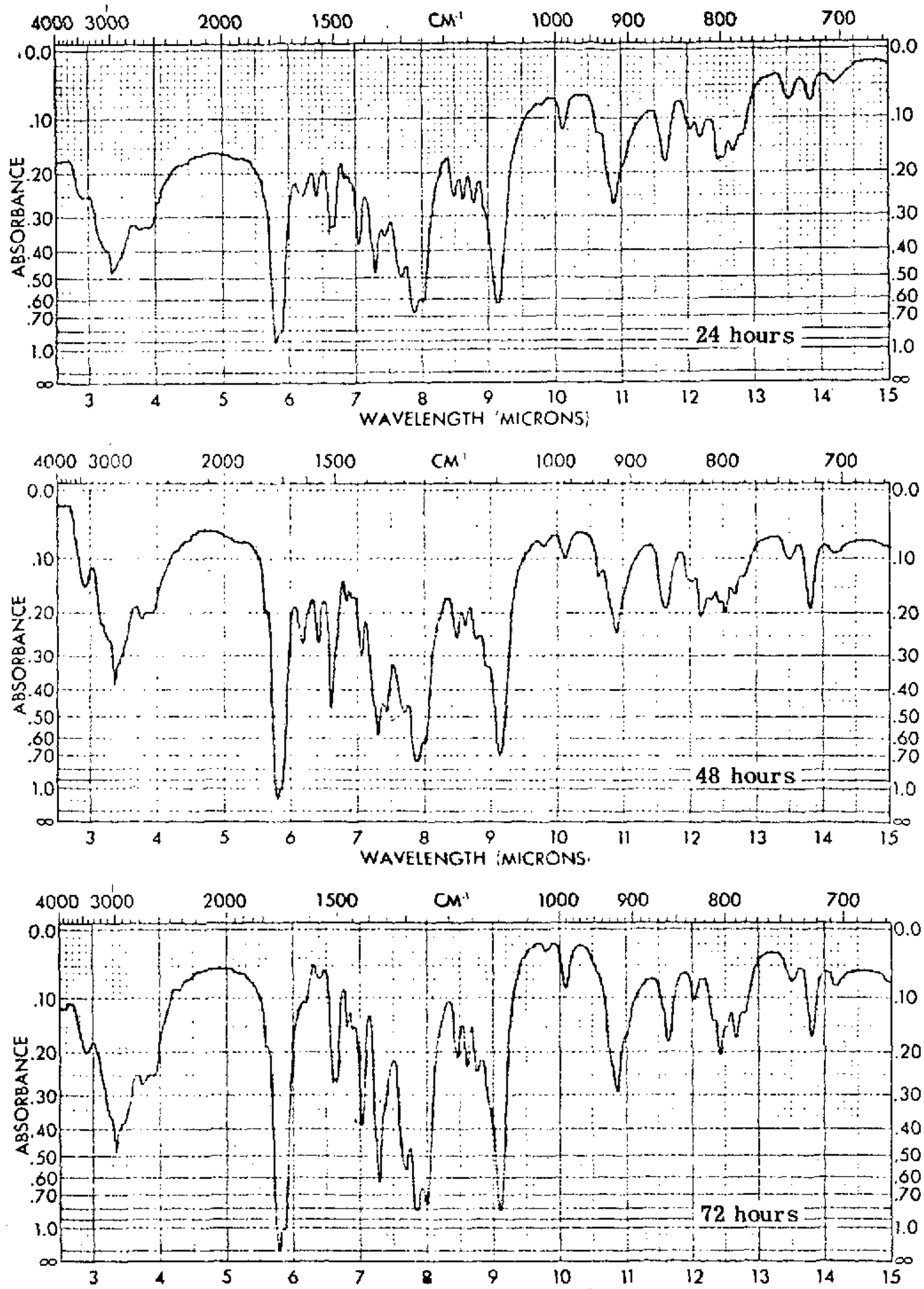
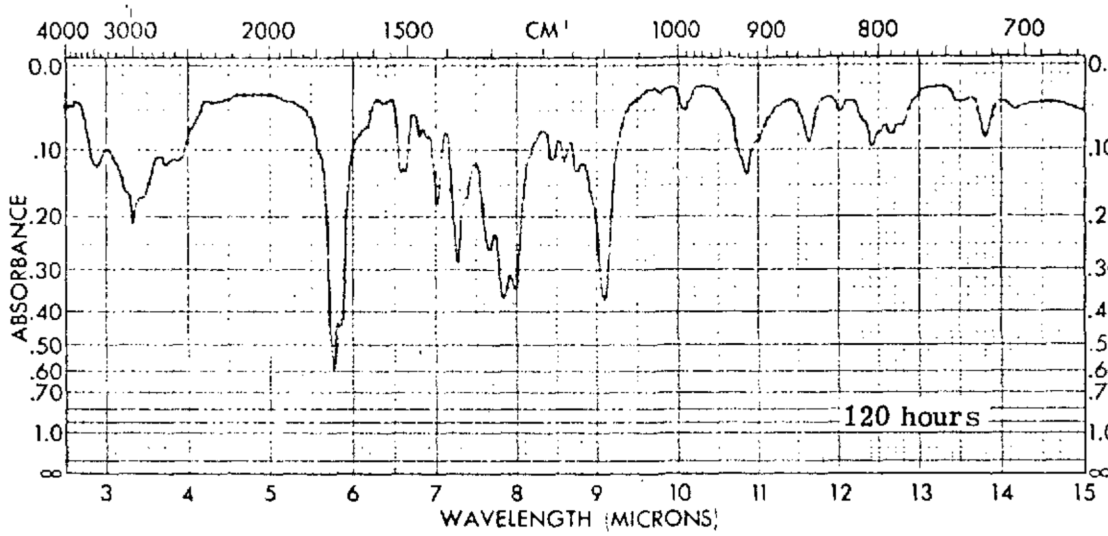


Figure 11(a).- Infrared spectra of PARA open tube specimens annealed at 140°C.



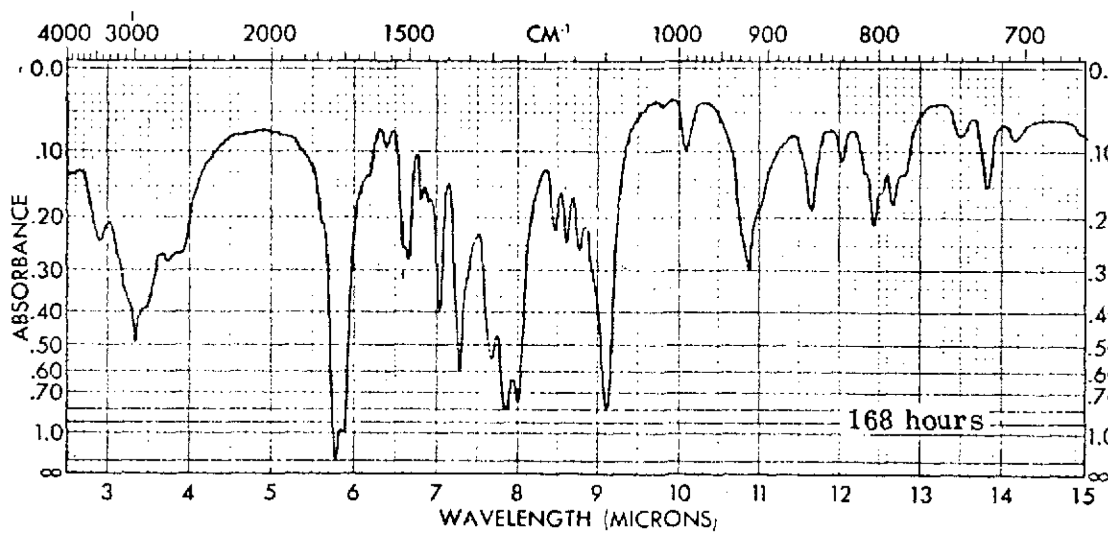


Figure 11(b).- Infrared spectra of PARA open tube specimens annealed at 140°C.

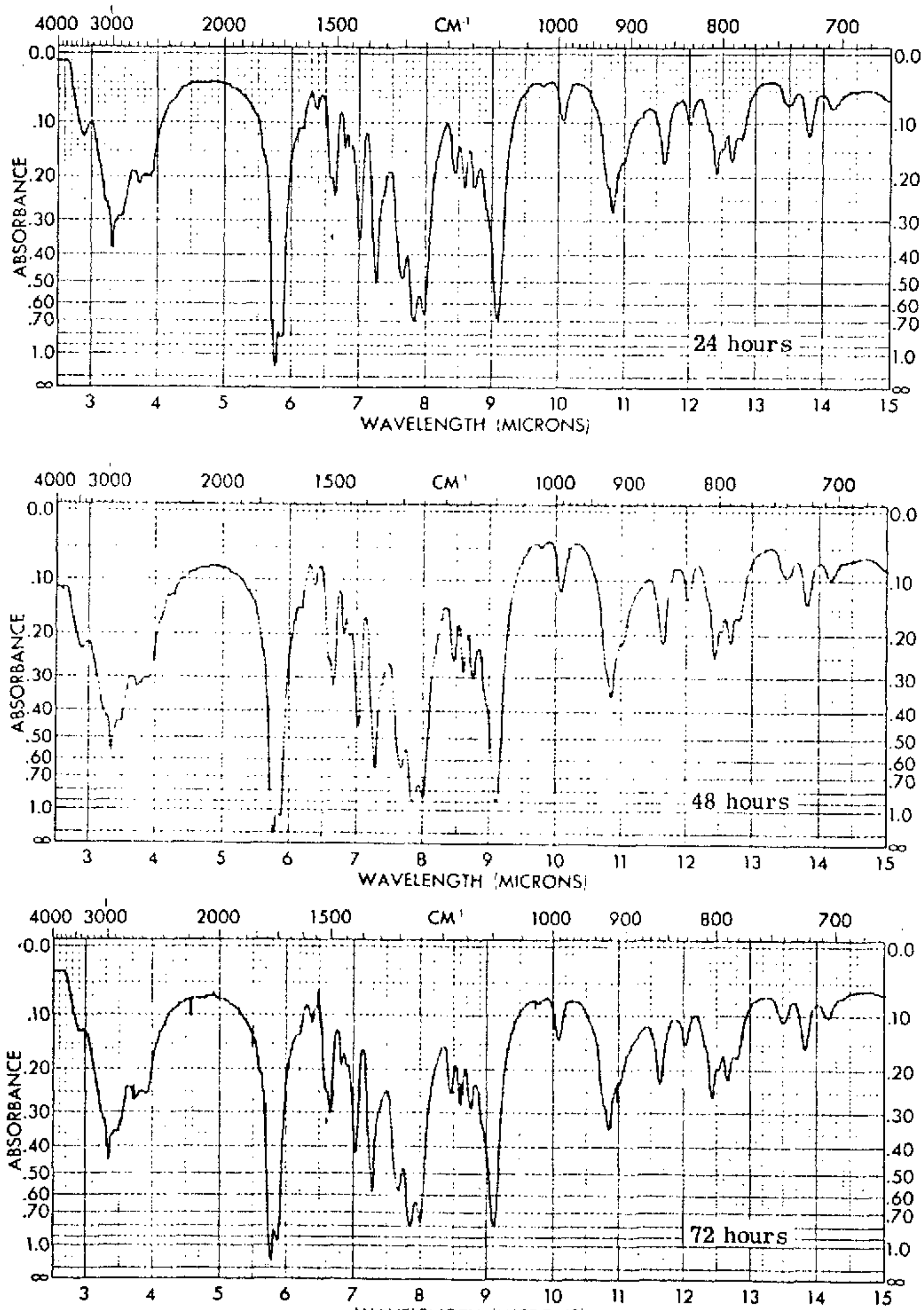
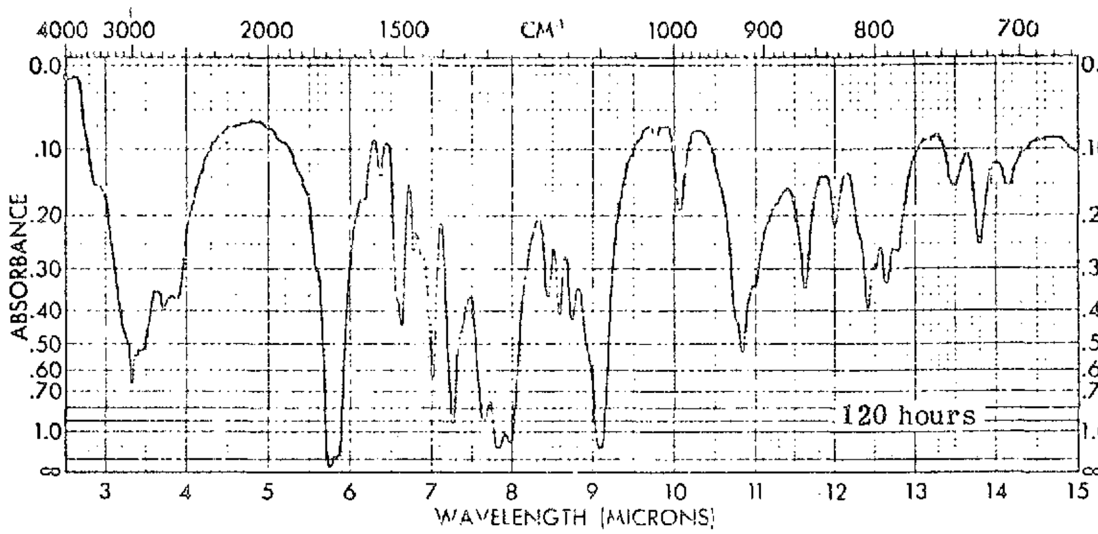


Figure 12(a).- Infrared spectra of PARA open tube specimens annealed at 150°C.



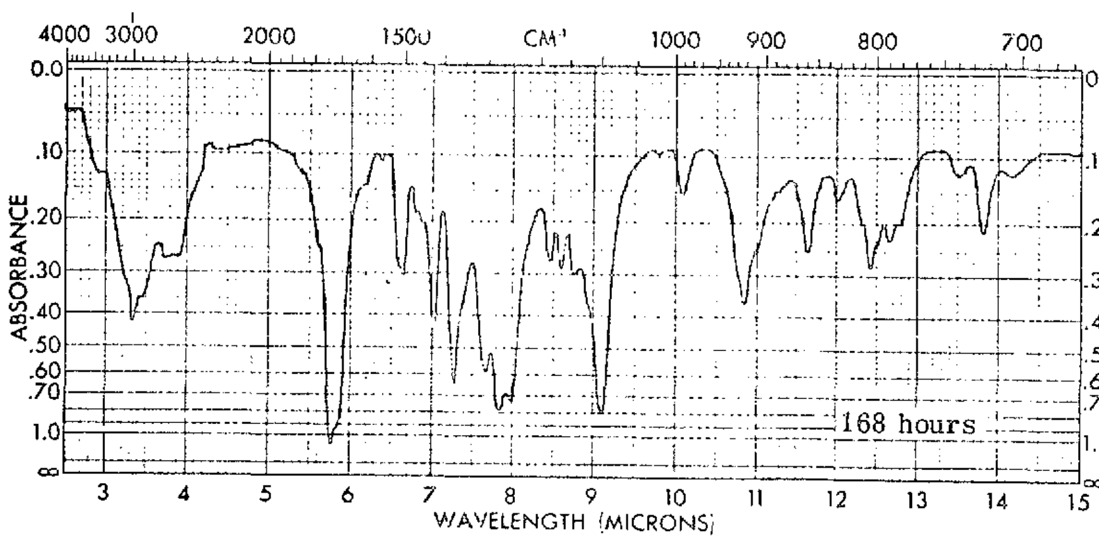


Figure 12(b).- Infrared spectra of PARA open tube specimens annealed at 150°C.

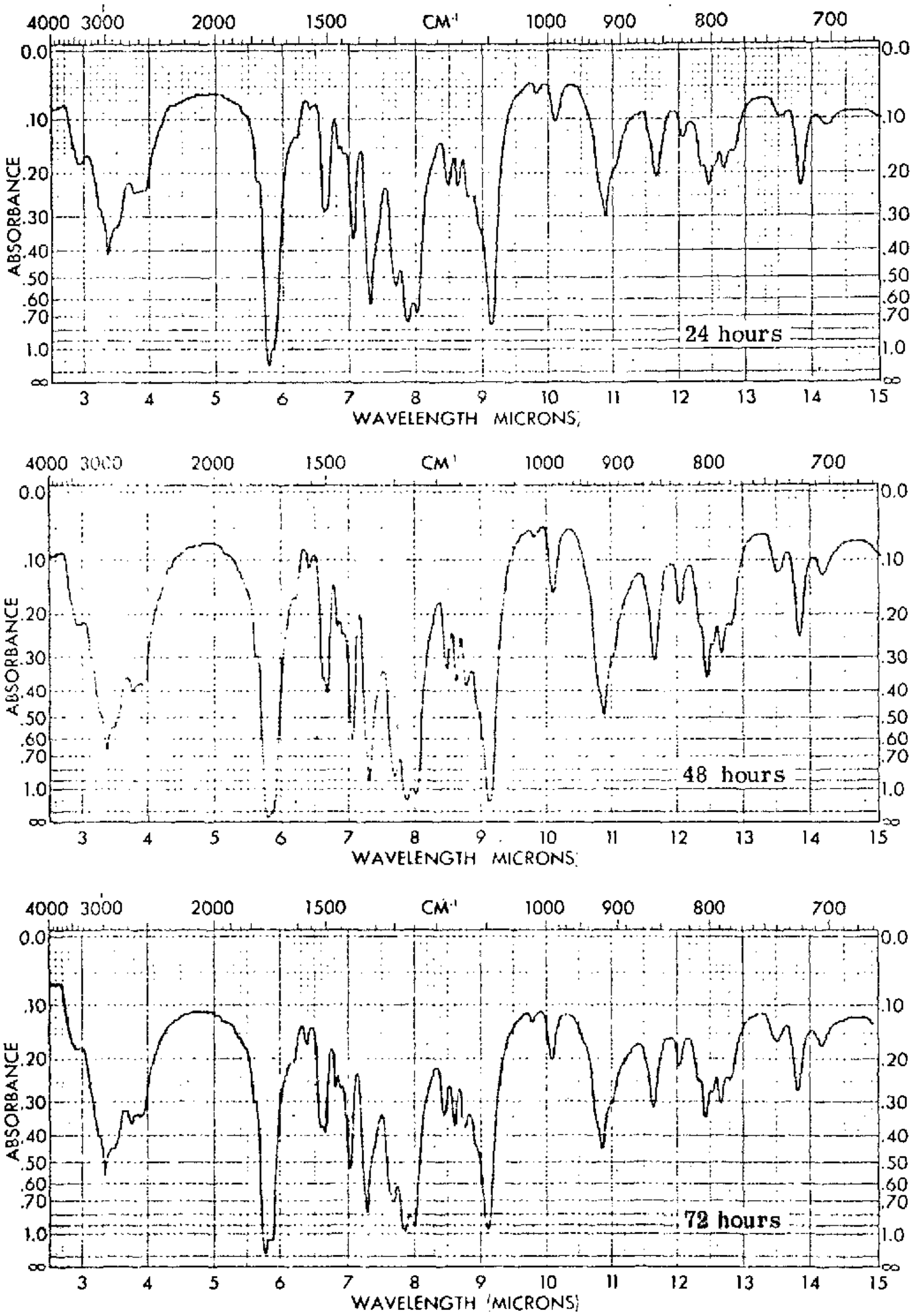
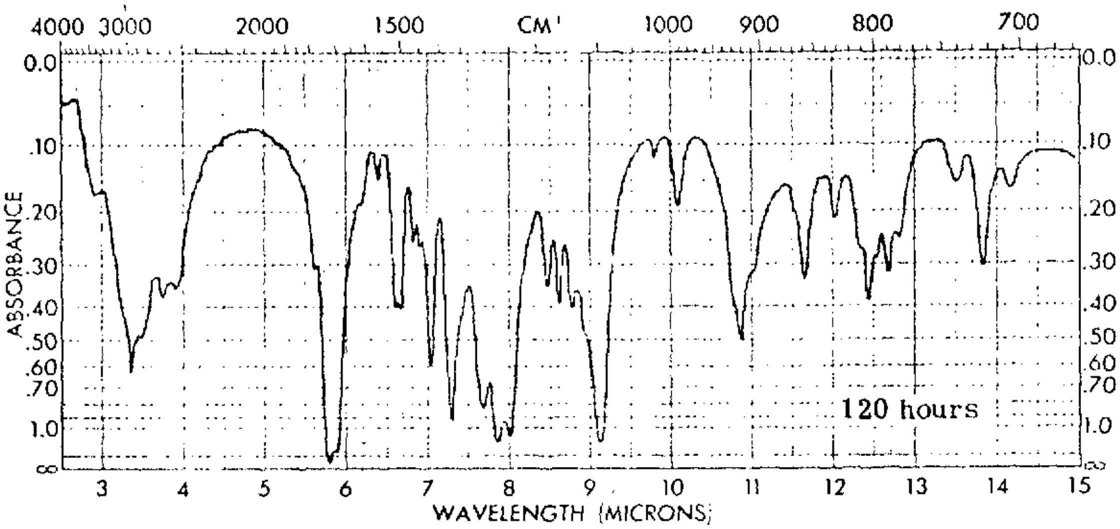


Figure 13(a).- Infrared spectra of PARA open tube specimens annealed at 160°C.



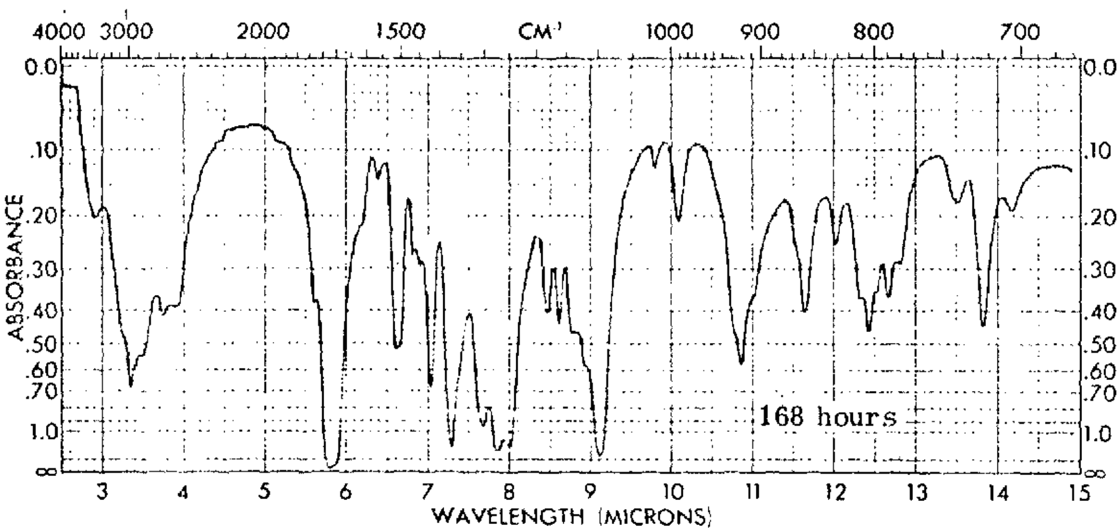


Figure 13(b).- Infrared spectra of PARA open tube specimens annealed at 160°C.

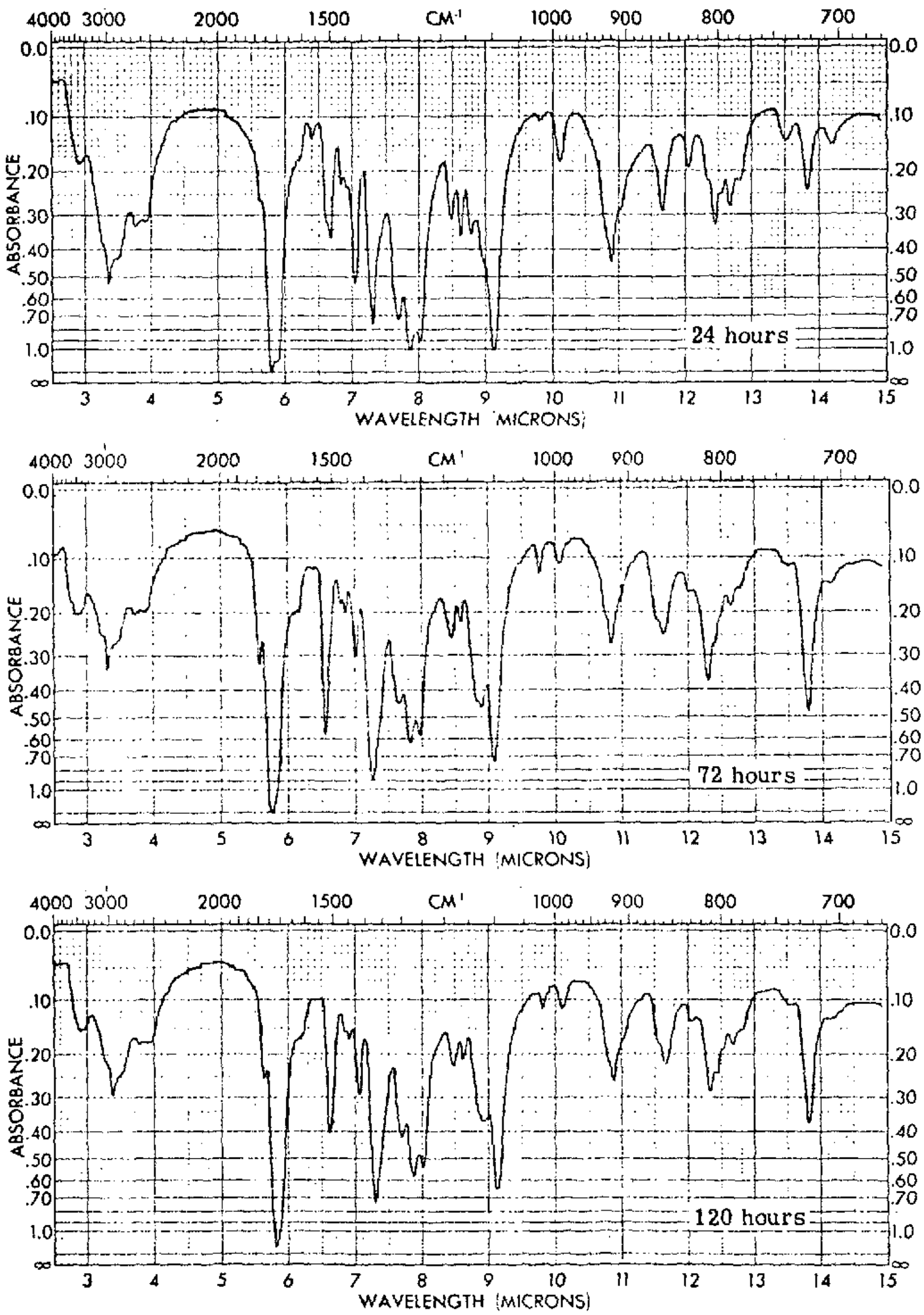
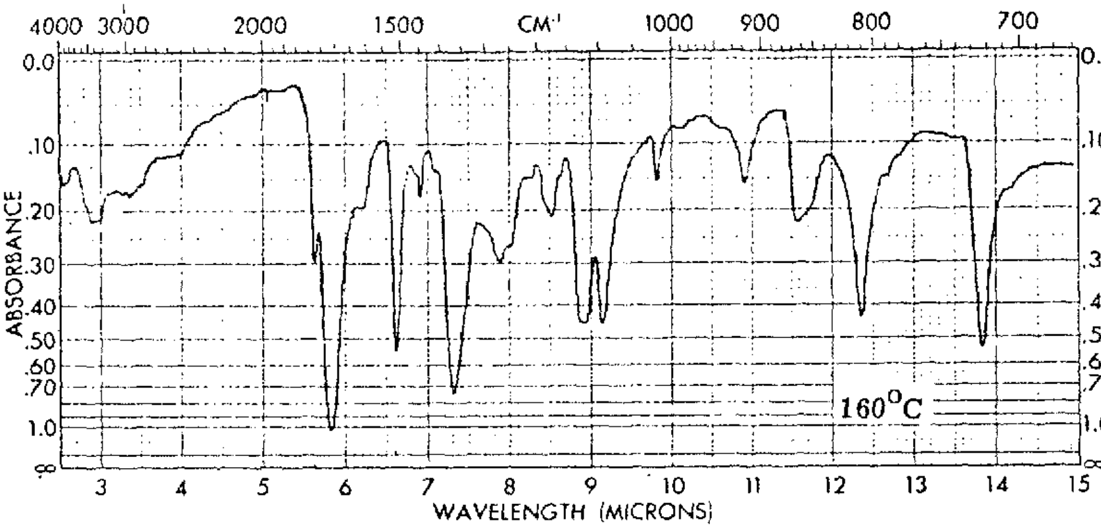


Figure 14.- Infrared spectra of PARA open tube specimens annealed at 170°C.



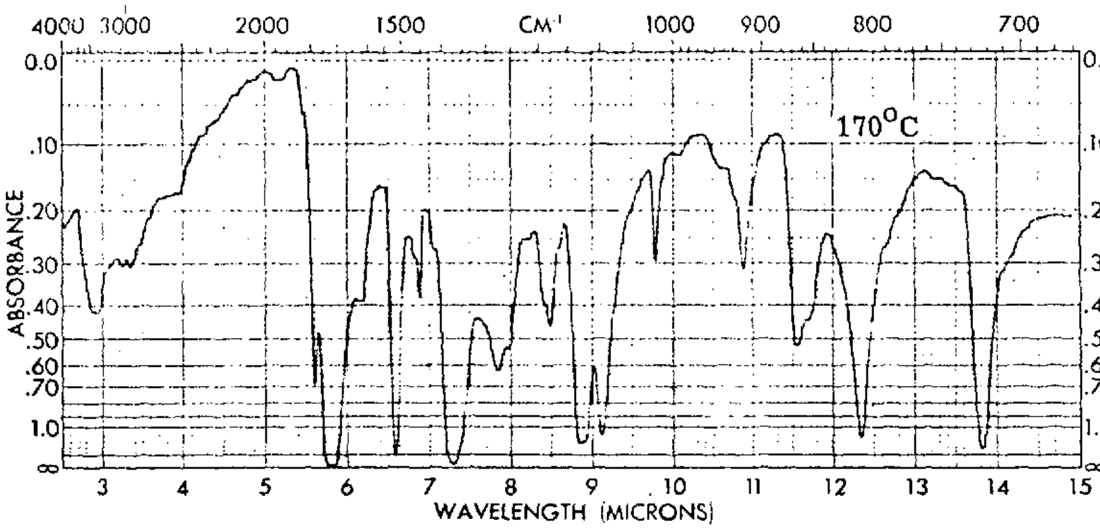
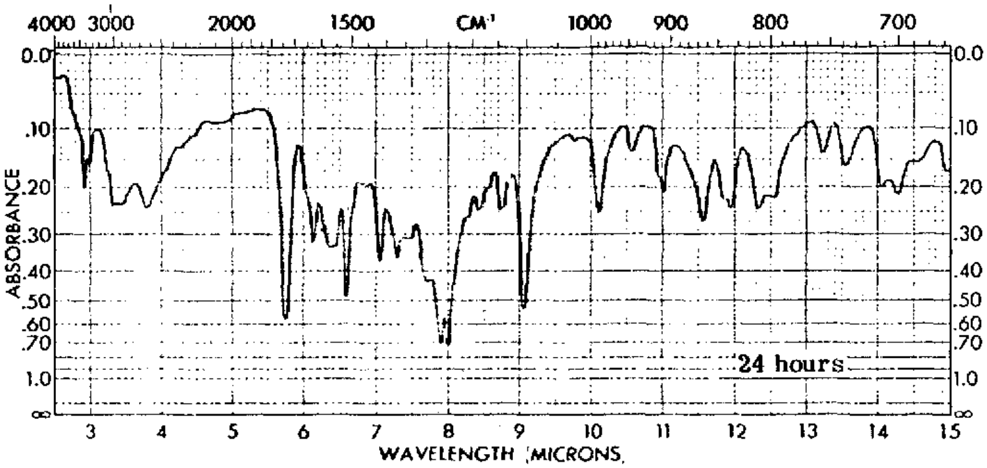


Figure 15.- Infrared spectra of PARA sealed tube specimens annealed for 168 hours.



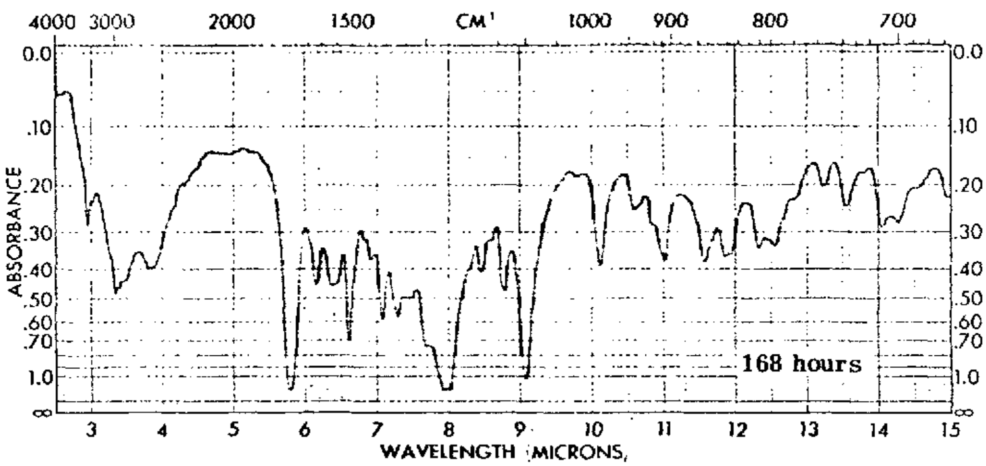


Figure 16.- Infrared spectra of META open tube specimens annealed at 120°C.

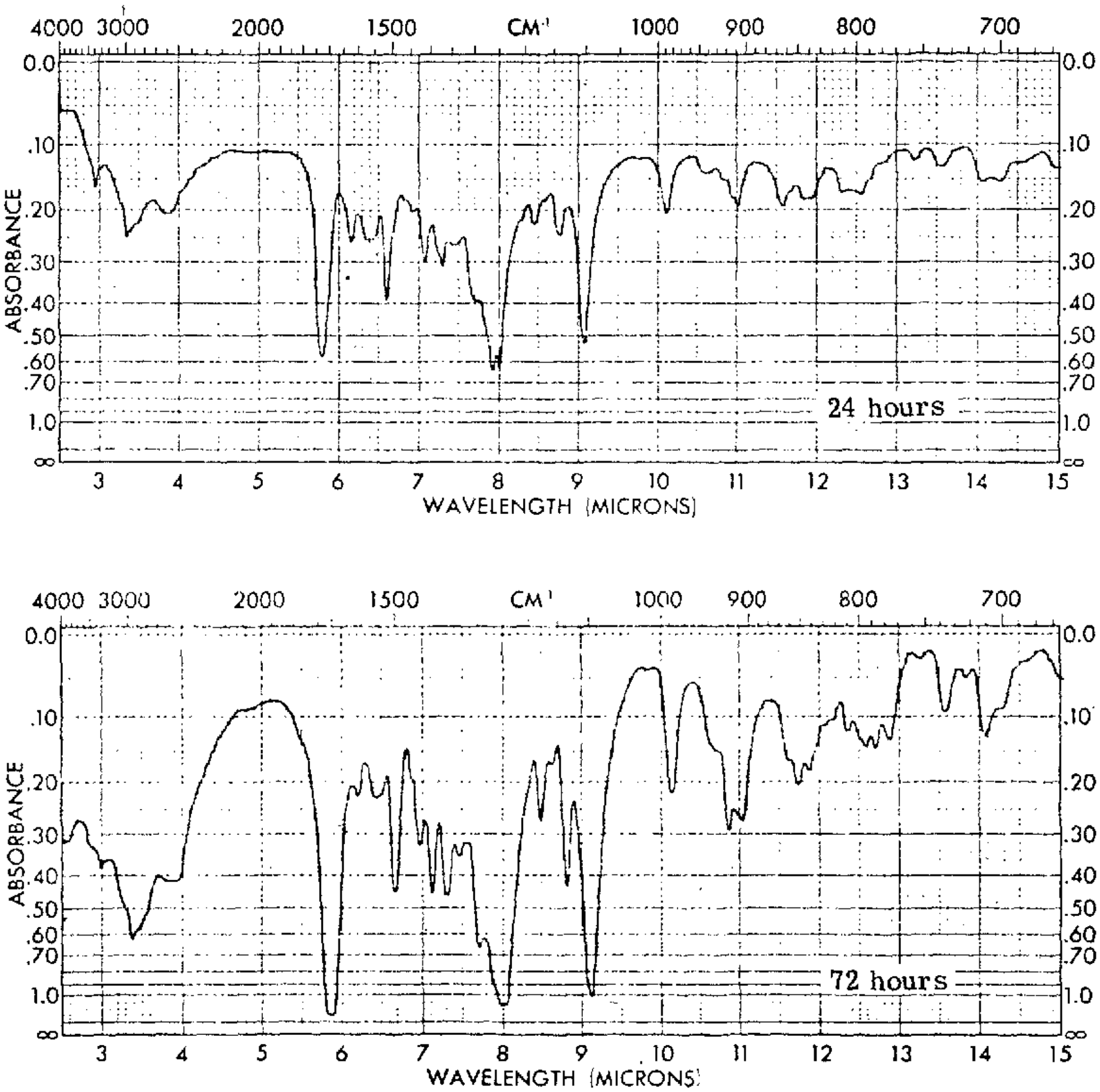
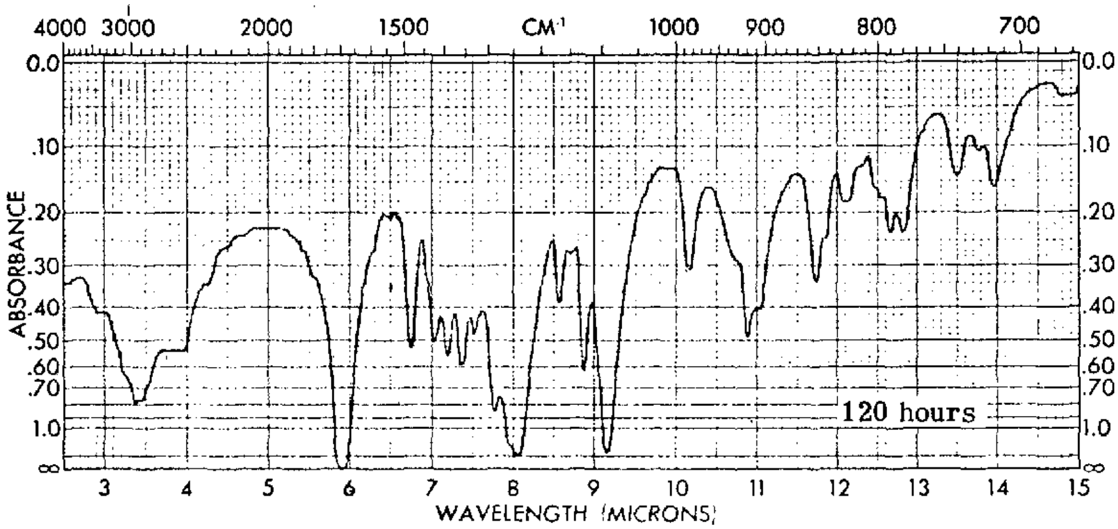


Figure 17(a).- Infrared spectra of META open tube specimens annealed at 130°C.



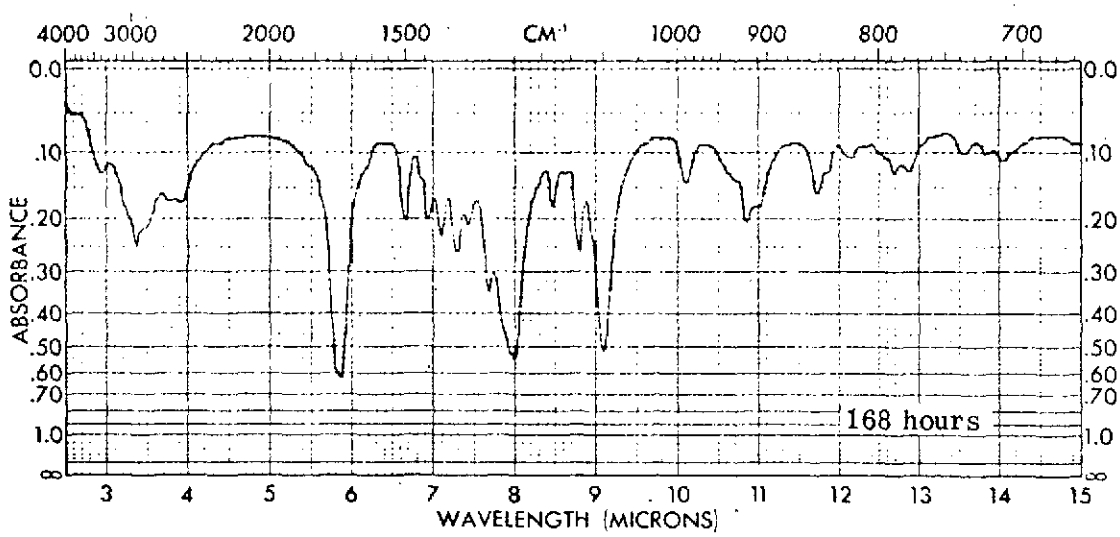


Figure 17(b).- Infrared spectra of META open tube specimens annealed at 130°C.

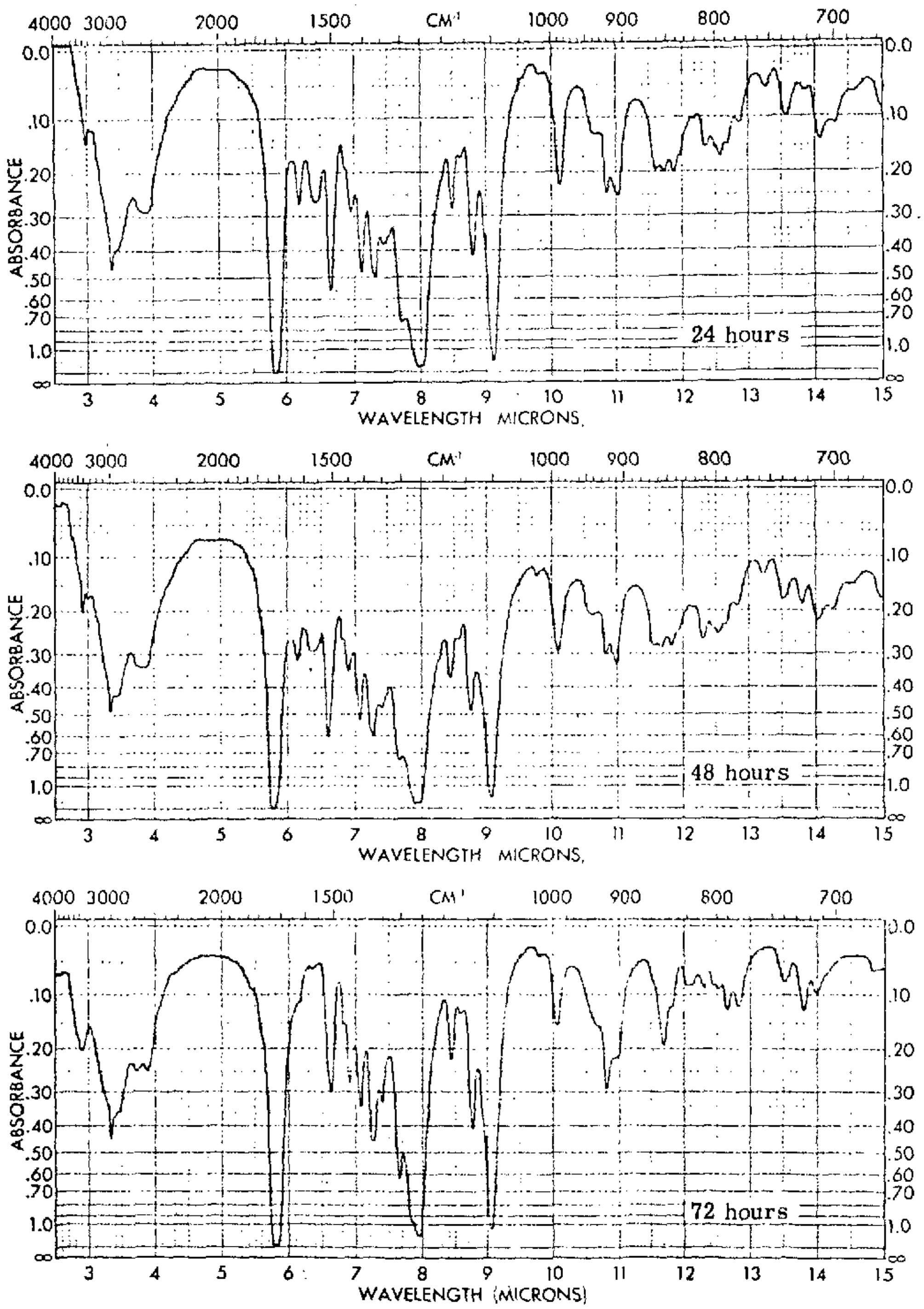
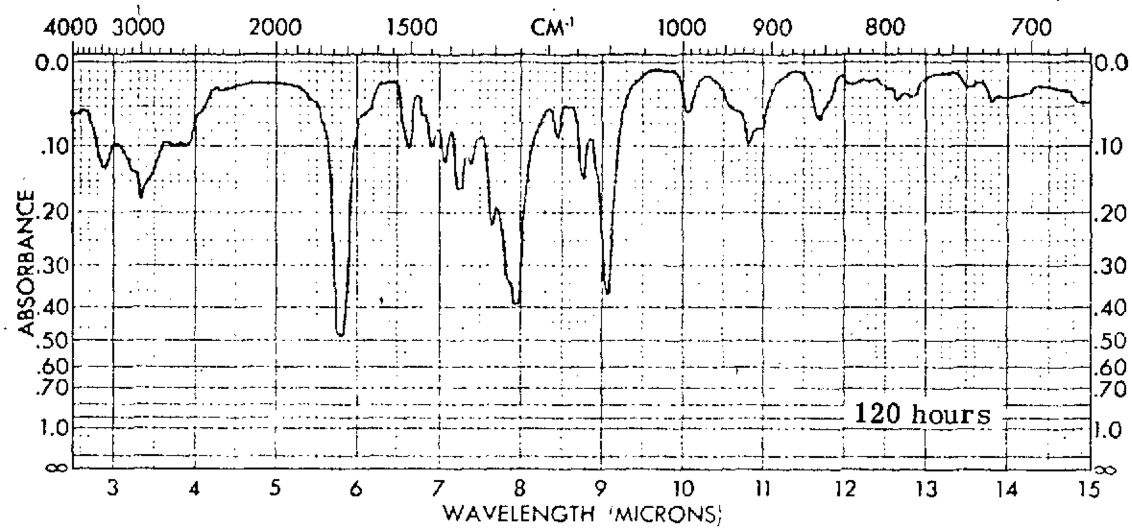


Figure 18(a).- Infrared spectra of META open tube specimens annealed at 140°C.



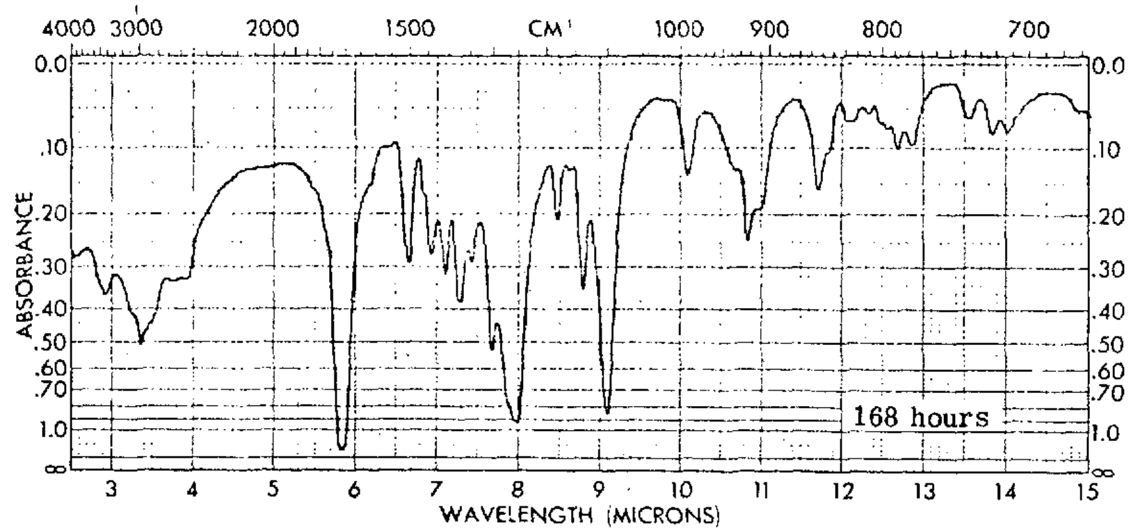


Figure 18(b).- Infrared spectra of META open tube specimens annealed at 140°C.

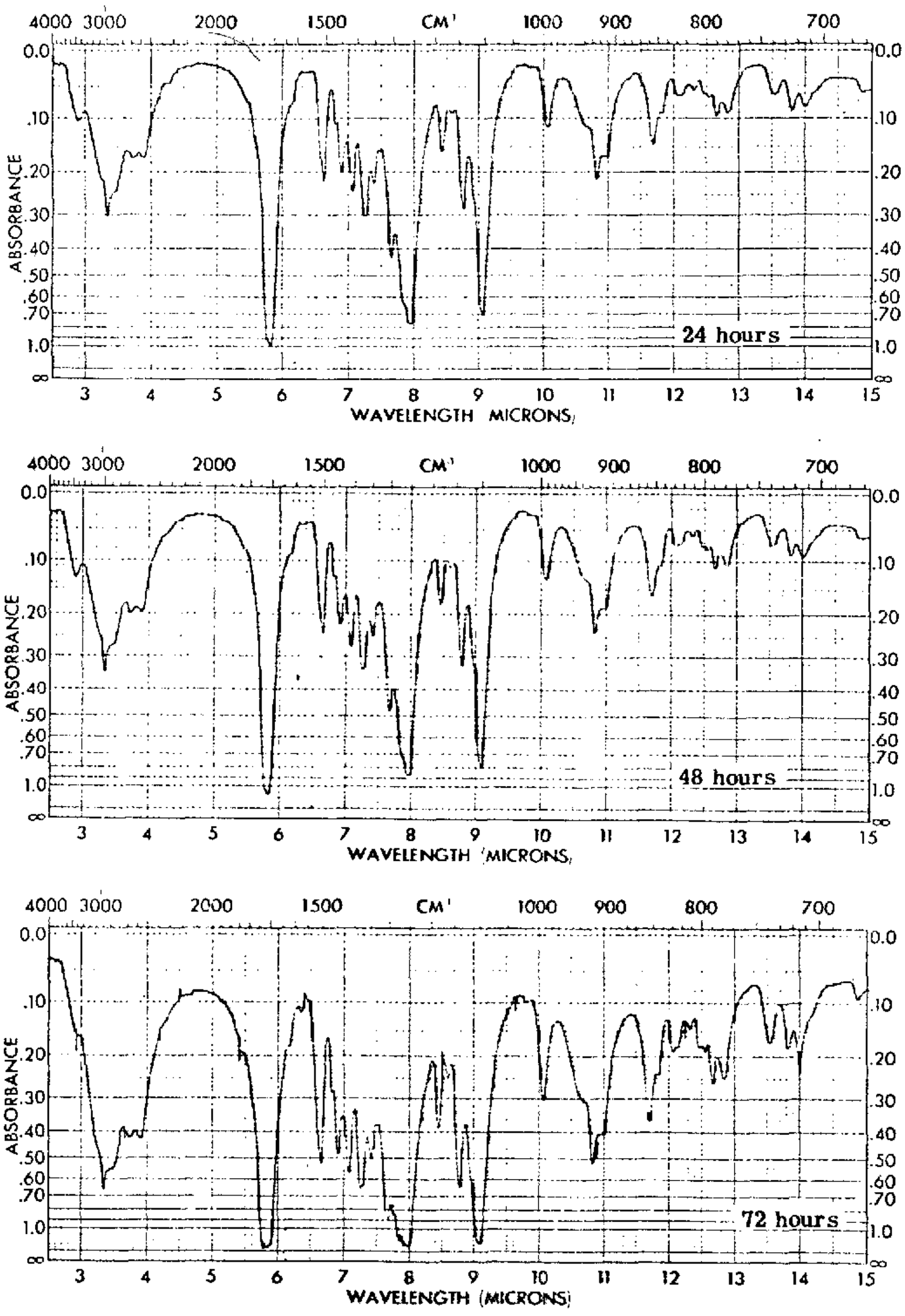
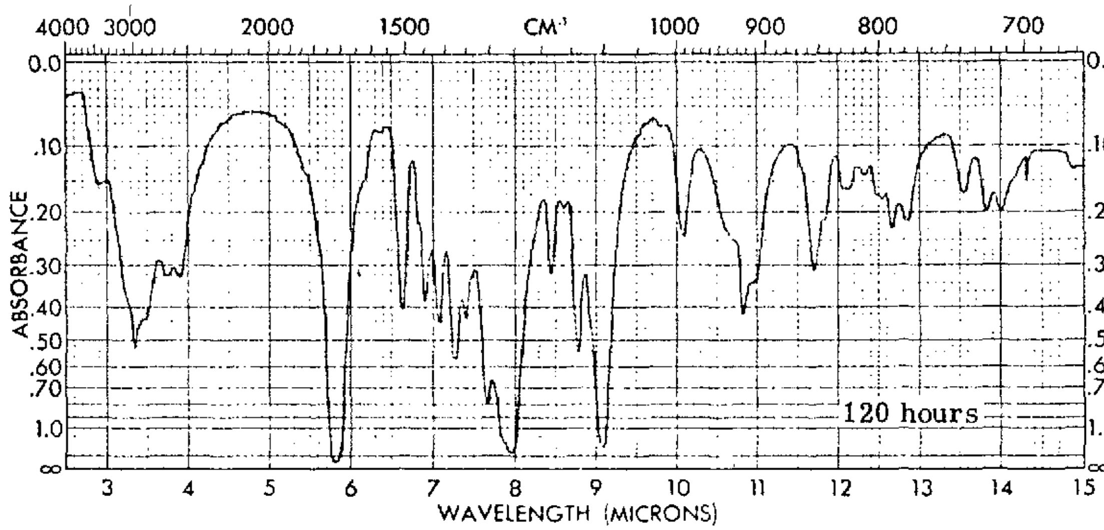


Figure 19(a).- Infrared spectra of META open tube specimens annealed at $150^{\circ}C$.



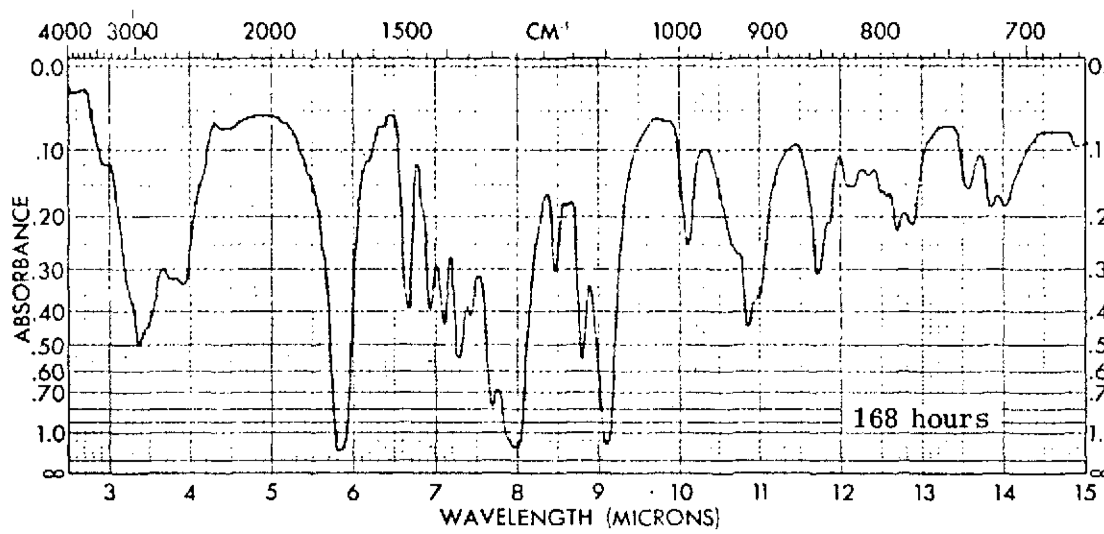


Figure 19(b).- Infrared spectra of META open tube specimens annealed at 150°C.

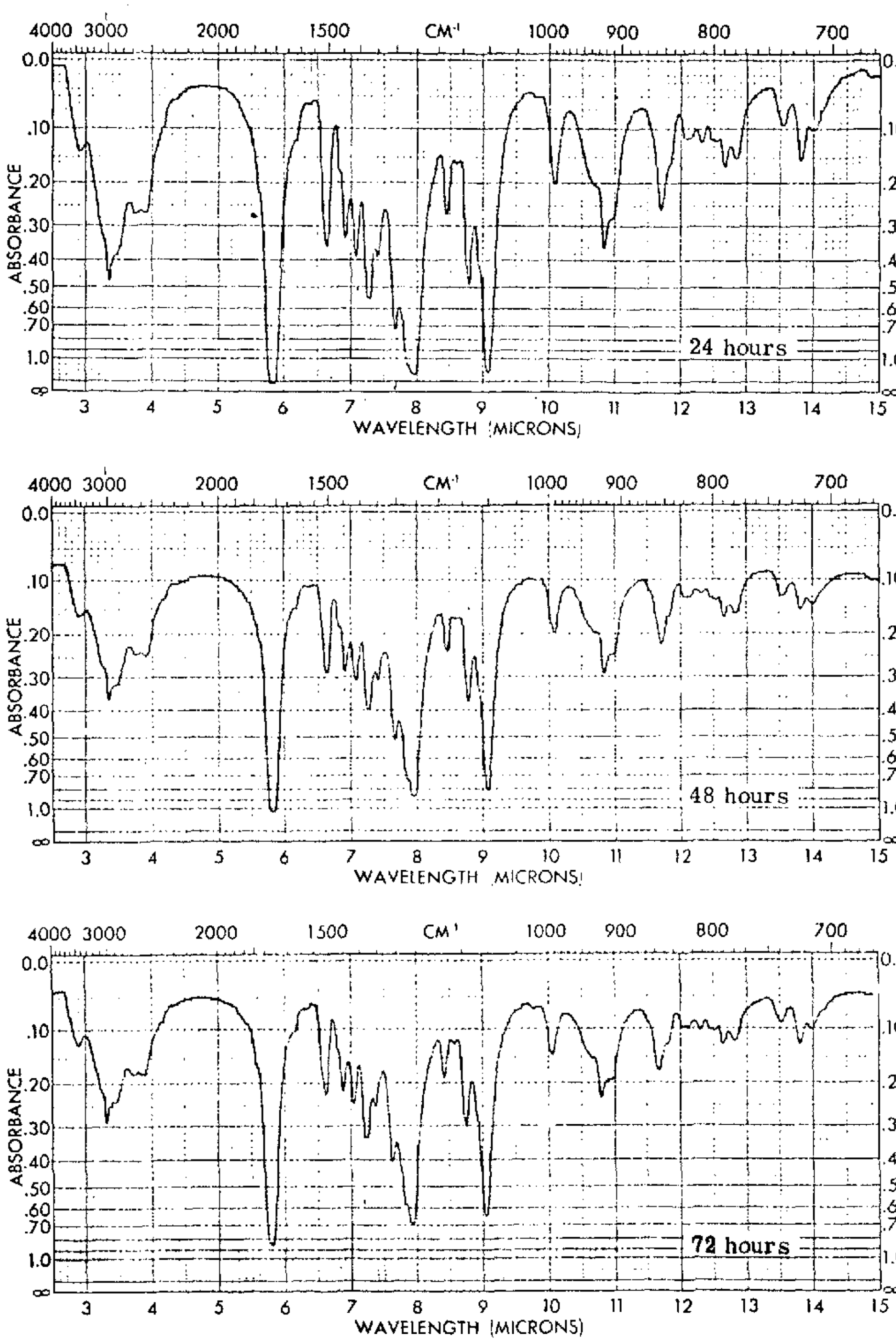
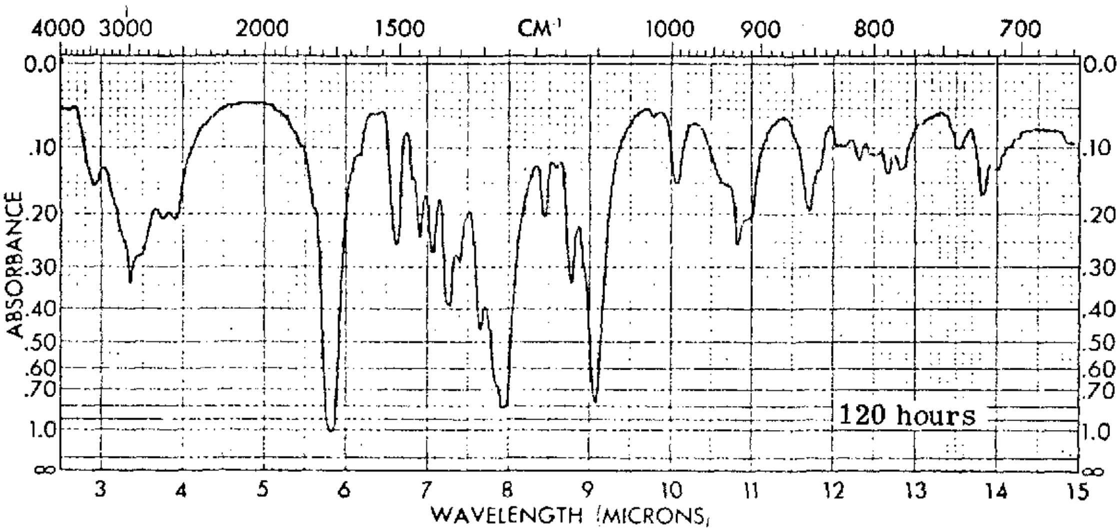


Figure 20(a).- Infrared spectra of META open tube specimens annealed at 160°C.



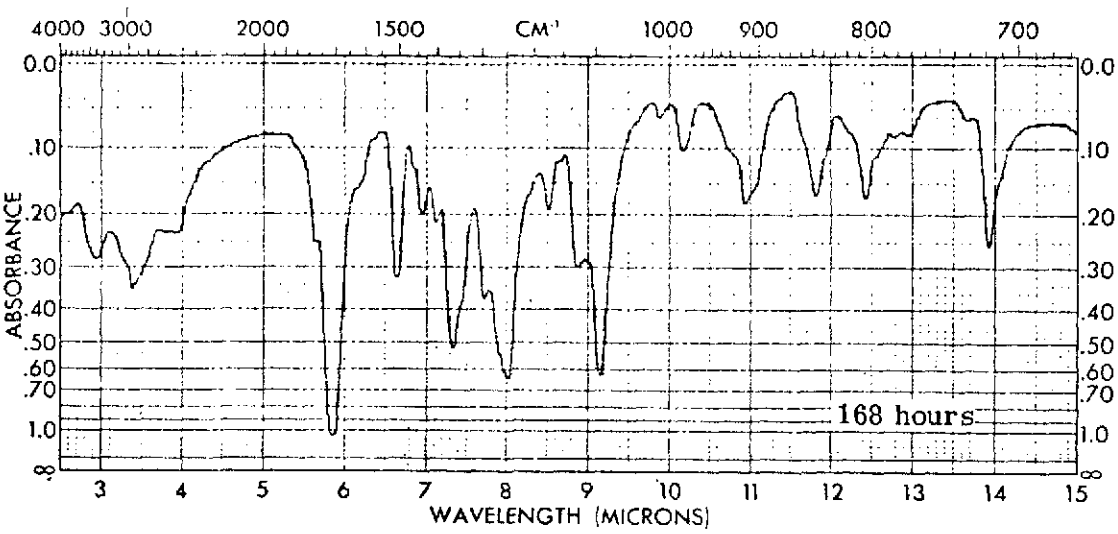


Figure 20(b).- Infrared spectra of META open tube specimens annealed at 160°C.

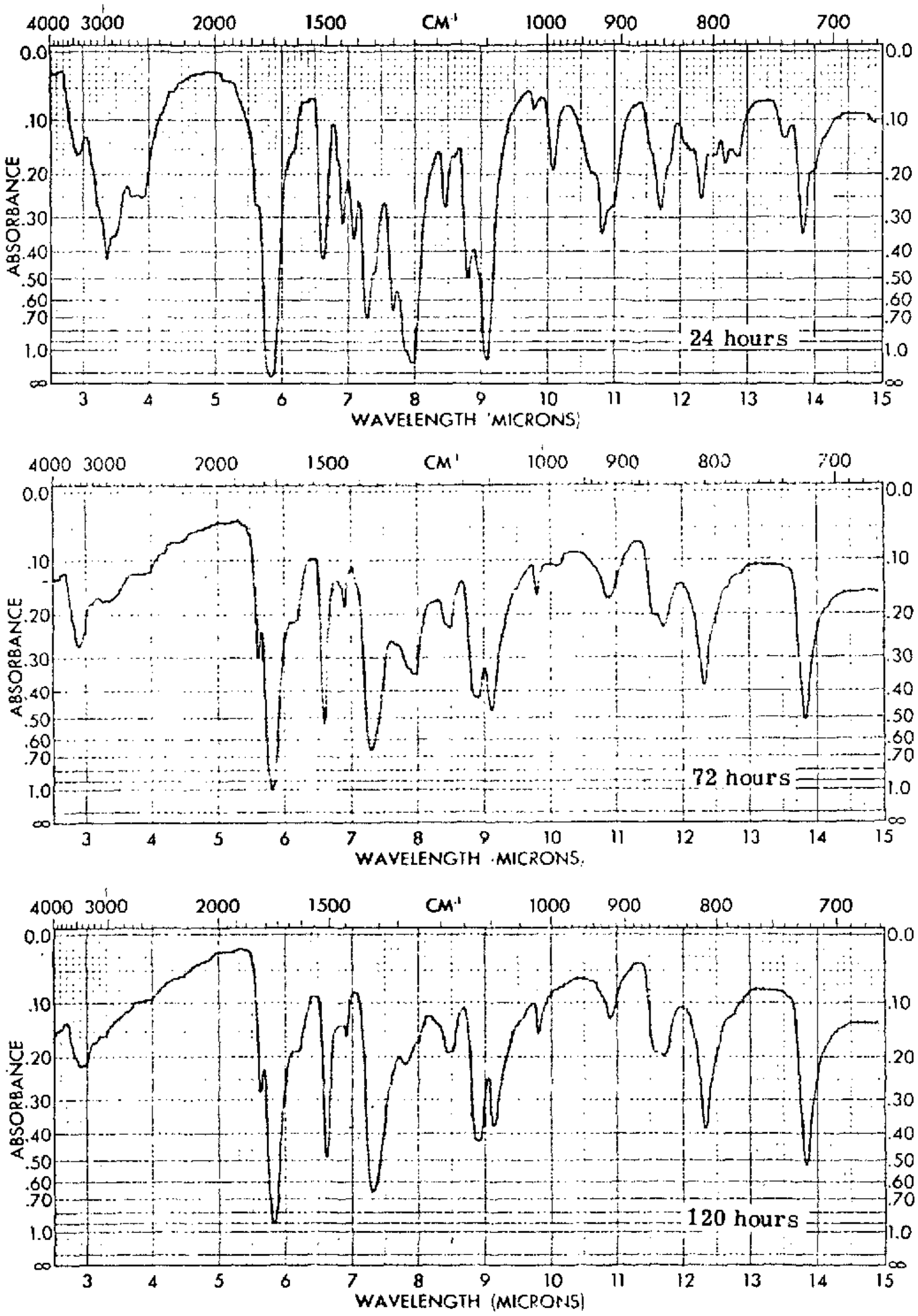
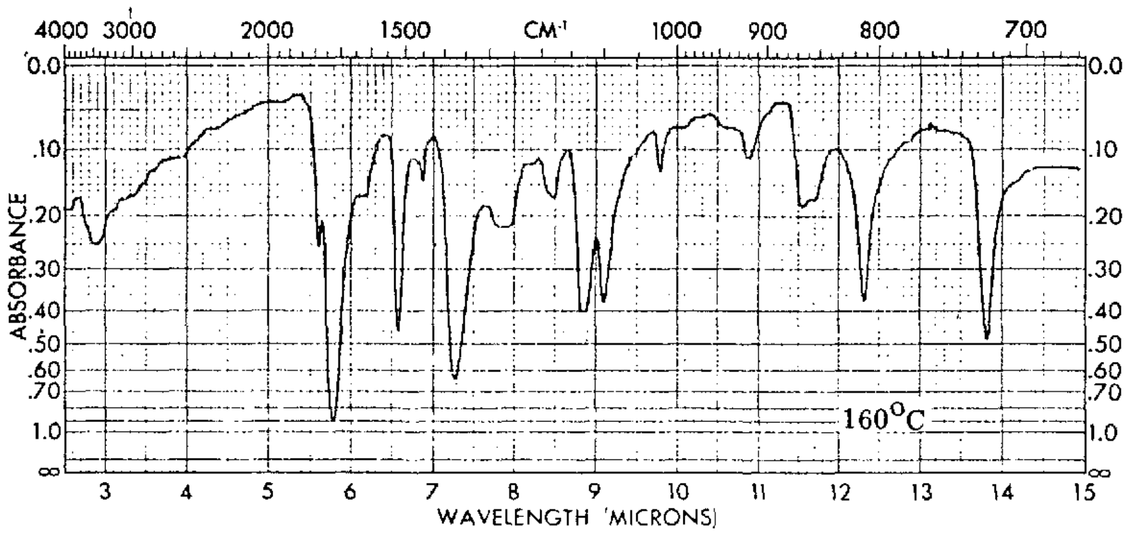


Figure 21.- Infrared spectra of META open tube specimens annealed at 170°C.



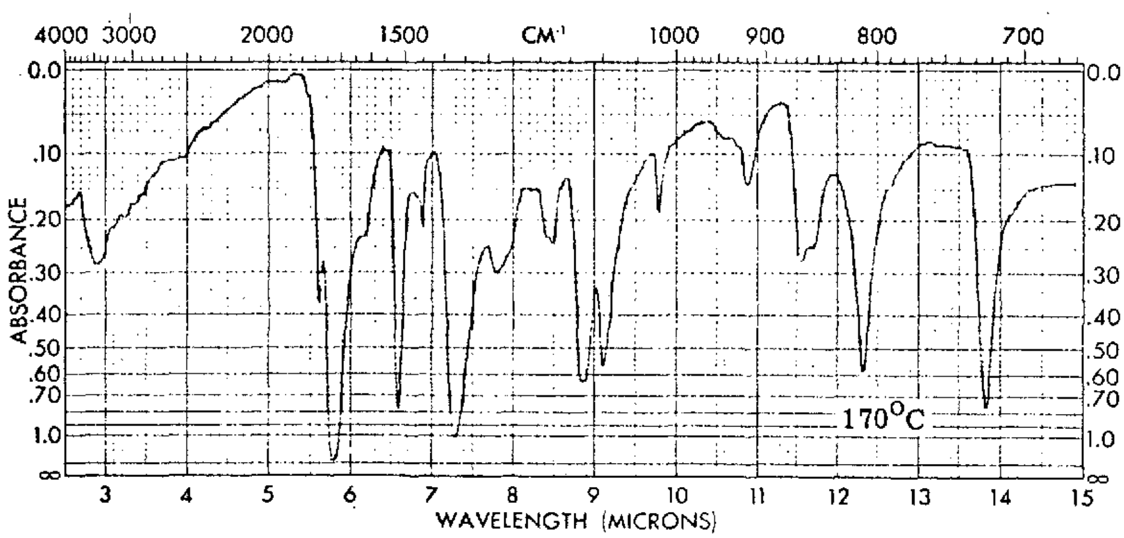


Figure 22.- Infrared spectra of META sealed tube specimens annealed for 168 hours.

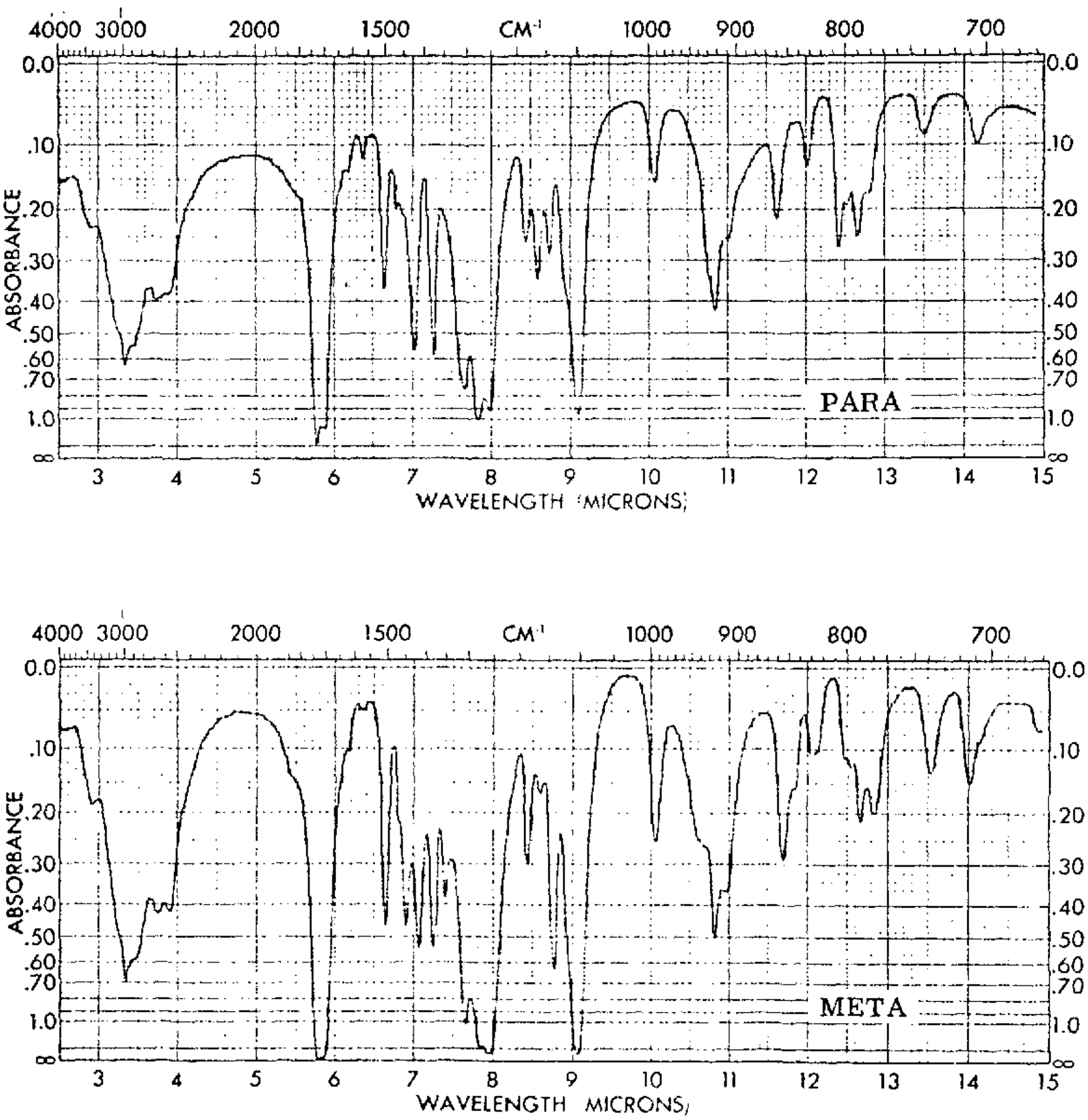


Figure 23.- Infrared spectra of PARA and META diisopropyl pyromellitic acid.

24), and specimens of selected compounds which act as models for the interpretation of spectra (Figure 25). The presented spectra of the unannealed specimens (Figures 8a and 8b) are partial tracings of the strip chart recording from the dual grating PE-421 instrument while the other IR data (Figures 9-25) are reduced reproductions of the original records from the prism instrument (PE 137B) and are presented to describe the effect of the annealing of these materials and their qualitative change with time and temperature.

The spectra of the original, unannealed, meta material (Figures 8a and 8b) contains sharp bands at 3375 and 3300 cm^{-1} which are ascribed to asymmetric and symmetric stretching of NH_2. Both bands are shifted downward from the position of the free amino group (3500 and 3400 cm^{-1})[20] by about 110 cm^{-1}. The calculated position of the lower band (symmetric stretch) by use of the empirical relation of Leonard and Owens[21] is 3302 cm^{-1} as compared to 3300 cm^{-1} measured. The implication is that the shift to lower wave-numbers is caused by the participation of the N-H groups in hydrogen bonding and/or the effect of the crystal lattice. This assignment and the substantiation produced by the calculation from the empirical relation which shows that the wave-number combination for these bands is proper for N-H stretch rules out possibility "c" for the meta isomer.

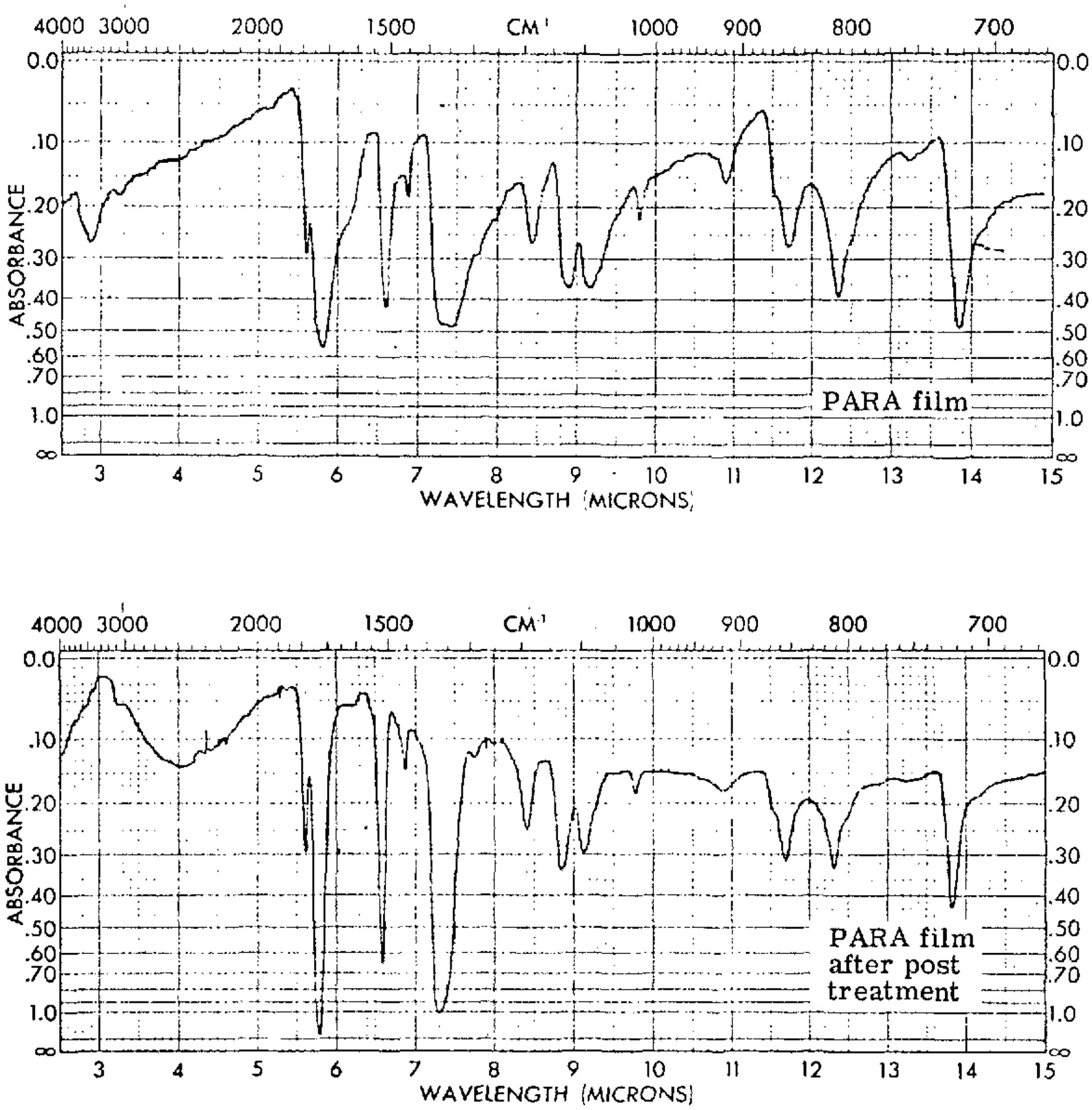


Figure 24.- Infrared spectra of solution made polymer.

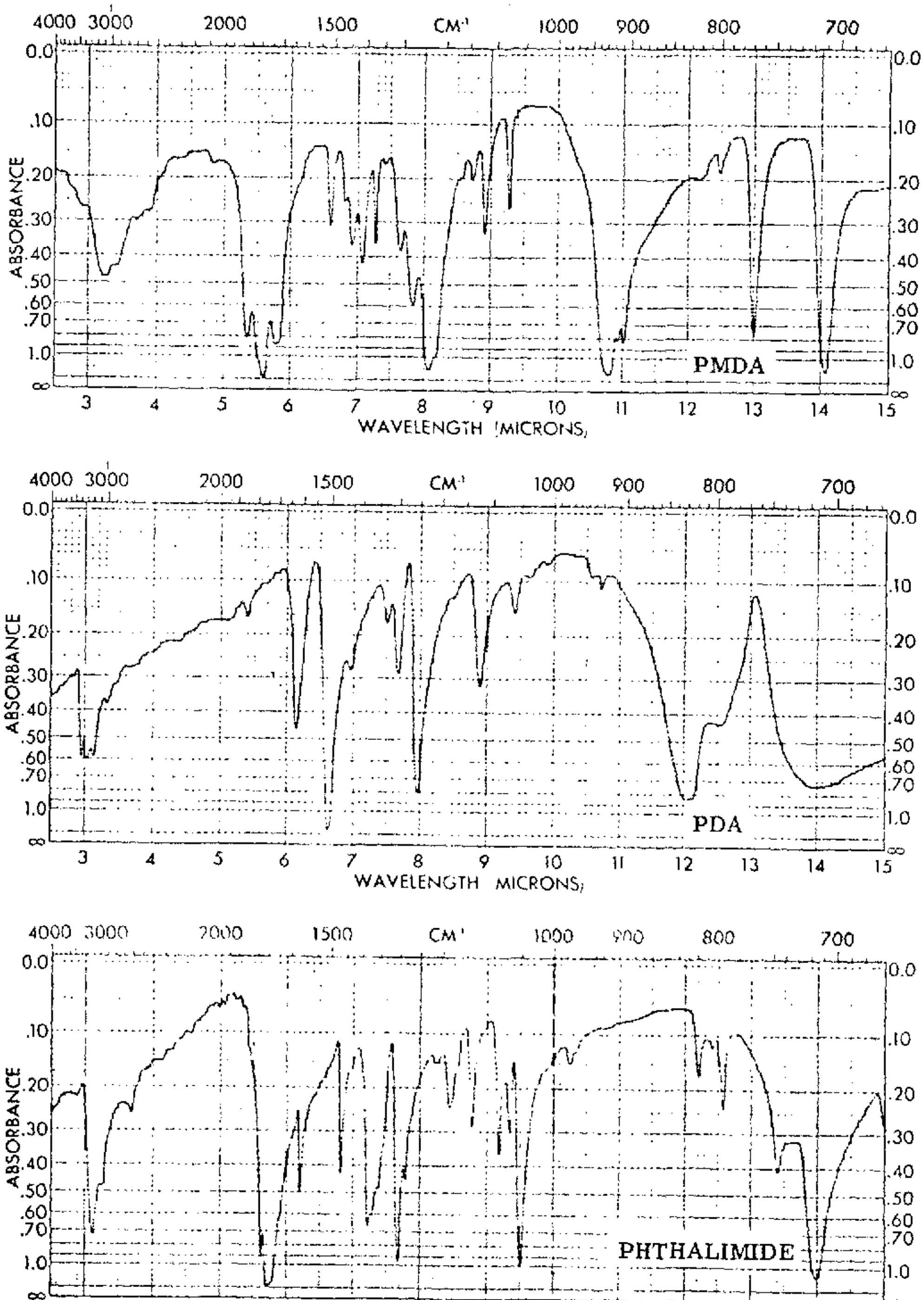


Figure 25.- Infrared spectra of selected compounds.

The spectra of the original, unannealed, para material contains a fairly broad band at 3175 cm^{-1} with a small broad shoulder at 3110 cm^{-1}. If these were N-H stretching bands, calculation from the empirical relation would yield a wave-number of 3127 for the symmetrical stretch as compared with 3110 cm^{-1} measured. Nakanishi[22] lists a difference of 12 cm^{-1} between calculated and measured as "good agreement". Bellamy[23] , in his discussion of amino acids (which exist as zwitterions), reports that no absorption occurs in the NH stretching region of 3500-3300 cm^{-1} but that instead a single band appears in the 3130-3030 cm^{-1} region which has been assigned to the NH_3^+ stretching mode. Although Nakanishi reports NH band shifting of 170 cm^{-1} and the present meta isomer NH bands are shifted by ca. 110 cm^{-1}, for the above para bands to be NH stretches a shift of ca. 310 cm^{-1} would be required which seems excessive. However, Bellamy[24] in his discussion of intermolecular hydrogen bonds, while expressing doubt that the small downward shifting (<100 cm^{-1}) of the NH bands in condensed phase amines are due to hydrogen bonding and, indeed, stating the possibility that they represent a solid state effect, gives an absorption range of 3320-3240 cm^{-1} for the association with ketonic groups, 3300-3150 cm^{-1} for the association with other nitrogen atoms, and the approximate range of 3400-3100 cm^{-1} for possible

associated NH stretch absorptions. He also indicates that broadening of the low-frequency band implies hydrogen bonding.

The orginal para isomer also has a broad band at about 3400 cm^{-1}. This can be the overtone of the C=O band or a hydrogen bonded OH stretch[25]. If this band (missing from the meta isomer spectra) is hydrogen bonded OH the implication is that there is a continuous variation of the NH stretch from that of the free amino down to the NH_3^+ with the lower frequency band broadening until it disappears at complete ionization, or when the partial changes become complete, as

$$\mathrm{Ar}-\overset{\mathrm{O}}{\overset{\|}{\mathrm{C}}}-\underset{\delta-}{\mathrm{O}}\ \ldots\ \mathrm{H}\ \ldots\ \underset{\mathrm{H}}{\overset{\mathrm{H}}{\mathrm{N}}}{}^{\delta+}-\mathrm{Ar} \longleftrightarrow \mathrm{Ar}-\overset{\mathrm{O}}{\overset{\|}{\mathrm{C}}}-\overset{-}{\mathrm{O}}\quad \mathrm{H_3}\overset{+}{\mathrm{N}}-\mathrm{Ar},$$

the present case being border line, close to salt. Or, if as implied by Bellamy, the greatest band lowerings are produced by N-N interactions, and if this type of interaction is that required to produce the measured effect, we would despair of forming polymer from the para isomer in the solid state in the topochemical sense.

Infrared spectra of acids, obtained on solids, have shown OH absorptions occurring as broad bands over the range of 2500-3000 cm^{-1}, with a main peak near 3000 cm^{-1} and a satellite near 2650 cm^{-1}, while lacking the free carboxyl

absorption, 3500-3600 cm^{-1}.[26] Both the meta and para isomers (as well as the meta and para diacid-diester starting material, Figure 23) lack the free OH absorption at 3500-3560 cm^{-1}. The para has a satellite at 2670 cm^{-1} and the meta has one at 2610 cm^{-1}. Although bands in this region can be assigned to symmetric NH_3^+ stretch, they are assigned to acid OH stretch (showing solid state association effects) since the broad band is missing in the 3030-3130 cm^{-1} region (aside from the small para shoulder at 3110 cm^{-1}) and there is only one, rather than a close pair of absorptions in the 2000-3000 cm^{-1} region for the two isomers. The parent diacid-diester compounds, which do not contain nitrogen, also absorb in this region. The band at 2985 cm^{-1}, found in both isomers and their starting materials, is assigned to isopropyl ester, perhaps overlapped with an OH stretch at 2970 cm^{-1}.

The meta and para isomers have highly (and equally) intense C=O stretching vibrations at 1715 and 1705 cm^{-1}, respectively. They have intense C-O stretches (not pure C-O)[27] at 1095 and 1085 cm^{-1}, respectively, supposedly arising from a C-O vibration coupled with an OH in-plane deformation vibration and being affected by structural changes in the opposite direction to that observed in C=O frequency.[28] It thus appears that since the C-O vibrations of the para

isomer at about 1700 and 1100 cm^{-1} are lower in frequency than the respective meta vibrations that the carboxyl groups of the para isomer are more highly associated and suggests the possibility of either a bifurcated hydrogen bond in this isomer or amine-amine acid-acid association. There are small bands in each isomer between 1610 and 1550 cm^{-1} and between 1400 cm^{-1} and 1300 cm^{-1} suggestive of ionized carboxyl.[29] However, since the strongest absorptions are in the about 1700 cm^{-1} region (carbonyl attached to aryl nuclei), it is assumed that there is un-ionized carboxyl present in both isomers based upon the presumption that the 1700 cm^{-1} band contains contribution from carboxyl carbonyl as well as ester carbonyl (since there is only one absorption here) coupled with the facts that the case for un-ionized amine (and thus carboxyl) is more evident for the meta isomer and that these carbonyl absorptions are of comparable magnitude.

For the current analysis it is assumed that both isomers exist before annealing, in the un-ionized state, the meta NH stretch lowering being due to solid state effects and perhaps weak hydrogen bonding, while that of the para being due to strong hydrogen bonding. The para isomer may contain some ionization. The spectra is cluttered with possibilities and overlaps and confused by circumstances such as meta bonded OH band being lower in frequency than the para's

while its C=O band at ca. 1700 cm^{-1} is higher than the para's and its N-H stretch being virtually undisturbed in comparison with the para's. A summary of the effects leading to the assumption of no ionization is as follows:

I) two N-H bands above the position of the ammonium band (which is missing)

II) the highest intensity bands are the single carbonyl vibrations, ca. 1700 cm^{-1}, of virtually equal intensity for both isomers

III) OH absorption in the range 2500-3000 cm^{-1} for both isomers, especially the one at 2970 cm^{-1}, which is also present in the diacid-diester starting material

Infrared spectra (annealed). The qualitative changes of the annealed precursors are described by the reduced reproductions of the records from the prism spectrophotometer in Figures 9-22. Infrared bands characteristic of the imide ring are reported to be the C-N at 1380 cm^{-1}, the C=O doublet at 1780 and 1720 cm^{-1}, and a band of unexplained origin at 720 cm^{-1}.[30] These bands are present in the spectra of phthalimide, which is a model compound representative of a single link of the polyimide structure. They are present in pyromellitic dianhydride (PMDA), with a shifting downward in wave number for the 720 cm^{-1} band, and including the 1380 cm^{-1} band, of different shape, even though this compound has bridged oxygen. They are not present in phenylene diamine, one of the parent compounds of the precursor isomers. (Figure 25).
These imide bands are not present in the parent diester-diacid compounds (Figure 23) with the

exception of the band at 1380 cm^{-1} which appears as a sharp spike similar in appearance that present in PMDA. It appears that the 1380 cm^{-1} band is a poor choice to follow the formation of the imide ring and if used for such purpose must be rather broad.

Infrared evidence for the imide ring system appears in the lowest temperature para annealings. While missing in the 24 hour, 120°C annealing, imide bands occur in the 168 hour spectrum for this temperature as small shoulder at 1780 cm^{-1} and a small but distinct peak at 720 cm^{-1}. (Figure 9). For the 130° annealings (Figures 10 a & b) there is slight indication for the 720 cm^{-1} absorption at even 24 hours, but definite presence at 72, 120, and 168 hours. The 1780 cm^{-1} absorption is illusory at 72 and 120 hours at this temperature but definite at 168 hours along with the 1720 cm^{-1} absorption. The 1720 cm^{-1} absorption is a poor one to follow in these spectra since it occurs at the bottom of the intense carbonyl absorption and is obscured in several of the presented spectra by the wrong choice of attenuation for the concentration of absorbing material in the optical path. Imide absorption is definite at 720 cm^{-1} and 1780 cm^{-1} for the para precursors annealed at 140°C and above (Figures 11-15) for all annealing times, especially the sealed tube specimens (Figure 15) in which the absorptions at 1380 and

720 cm^{-1} rival the carbonyl in magnitude. In a spectrum of solution cast para film the 720 and 1380 cm^{-1} absorptions appear with magnitude equivalent to that of the carbonyl while a spectrum of film, post-treated by annealing in vacuo at 300°C for one hour, displays a 720 cm^{-1} absorption reduced in magnitude with respect to that of the 1380 cm^{-1} and carbonyl absorptions. (Figure 24).

There is no definitive evidence of the imide ring in the infrared spectra of the meta precursor for specimens annealed at 120°C. (Figure 16). There is slight indication of the 720 cm^{-1} absorption in specimens of this isomer annealed at 130°C for periods of time equal to or greater than 72 hours. (Figure 17). There is indication of the 720 cm^{-1} absorption, but not of the other imide ring bands, in the 140°C spectra (Figure 18) and comparable 720 cm^{-1} absorption, with slight indication of 1780 cm^{-1} absorption, in the 150°C, meta spectra (Figure 19). It is only in the 168 hour, 160°C, meta spectrum that absorption comparable to the para isomer is observed. (Figures 13 and 20). The spectra of the open tube 170°C meta specimens (Figure 21) and that of the sealed tube specimens (Figure 22) yield as much, or more, indication of the imide ring as the corresponding para isomer spectra. In fact, the only spectra indicating complete reaction, as revealed by the loss of the isopropyl absorption at 2985 cm^{-1},

are the meta 170°C, 72 and 120 hour, specimens and the sealed tube specimens of both isomers. If the requirement for complete reaction be the complete loss of absorption near 3000 cm^{-1}, the only specimens which are wholly polyimide in this sense are the sealed tube meta isomers and the 120 hour, 170°C meta isomer. Thus while imidization, as judged from infrared spectra, appears to proceed more rapidly initially for the para isomer, it is only the meta formulation which attains complete imidization.

If an amide had been formed as a stable intermediate a carbonyl absorption should occur near 1650 cm^{-1} (the Amide I band[31]), perhaps evidenced as a splitting of the current carbonyl toward a lower wave number. There is what appears to be a splitting of the carbonyl in the longer time, higher temperature specimens but this occurs in the region and the appropriate specimens for a 1720 cm^{-1} imide band. None of the specimens display an unambiguous Amide I band. The NH absorptions above 3000 cm^{-1} persist in the 120°C, para specimens and in the 24 hour, 130°C specimen and no others. In the spectra of the meta specimens the NH absorptions are more persistent, being present in the 120°C specimens and the 130°C up to and including 72 hours, but no other, in keeping with the present findings which imply that imidization occurs more rapidly initially in the para isomer. With

the disappearance of the HN absorption, there appears to be a broadening in the 3000 cm^{-1} region and a doubling in the 2500 - 2800 cm^{-1} region suggestive of the participation of a salt form as an intermediate but the doubling is present in the diacid-diester starting materials and the broadening is subjective since the curve is continuous through the former NH region.

<u>Powder Diffractometry</u>. The diffraction patterns of the annealed specimens were taken, using a General Electric XRD-5 instrument, in an attempt to record the crystallinity change as a function of time and temperature of annealing. As expected there was a progressive change of the individual patterns from those characteristic of the respective salts toward, but not reaching, that of the solution cast material. (Figure 2). Illustrative of this change is that recorded from the 170°C specimens. (Figures 26-29). It is observed that the broad diffraction band in the 20° (2θ) position of the solution cast material is still represented in the 170°C, 120 hour, specimens of both isomers by more than one differentiable peak. This would have to be interpreted by the usual methods of crystallinity determination by x-ray diffractometry[32-34], in which the specimen is mathematically positioned between maximum and minimum crystallinity diffraction patterns, as containing residual crystallinity. In

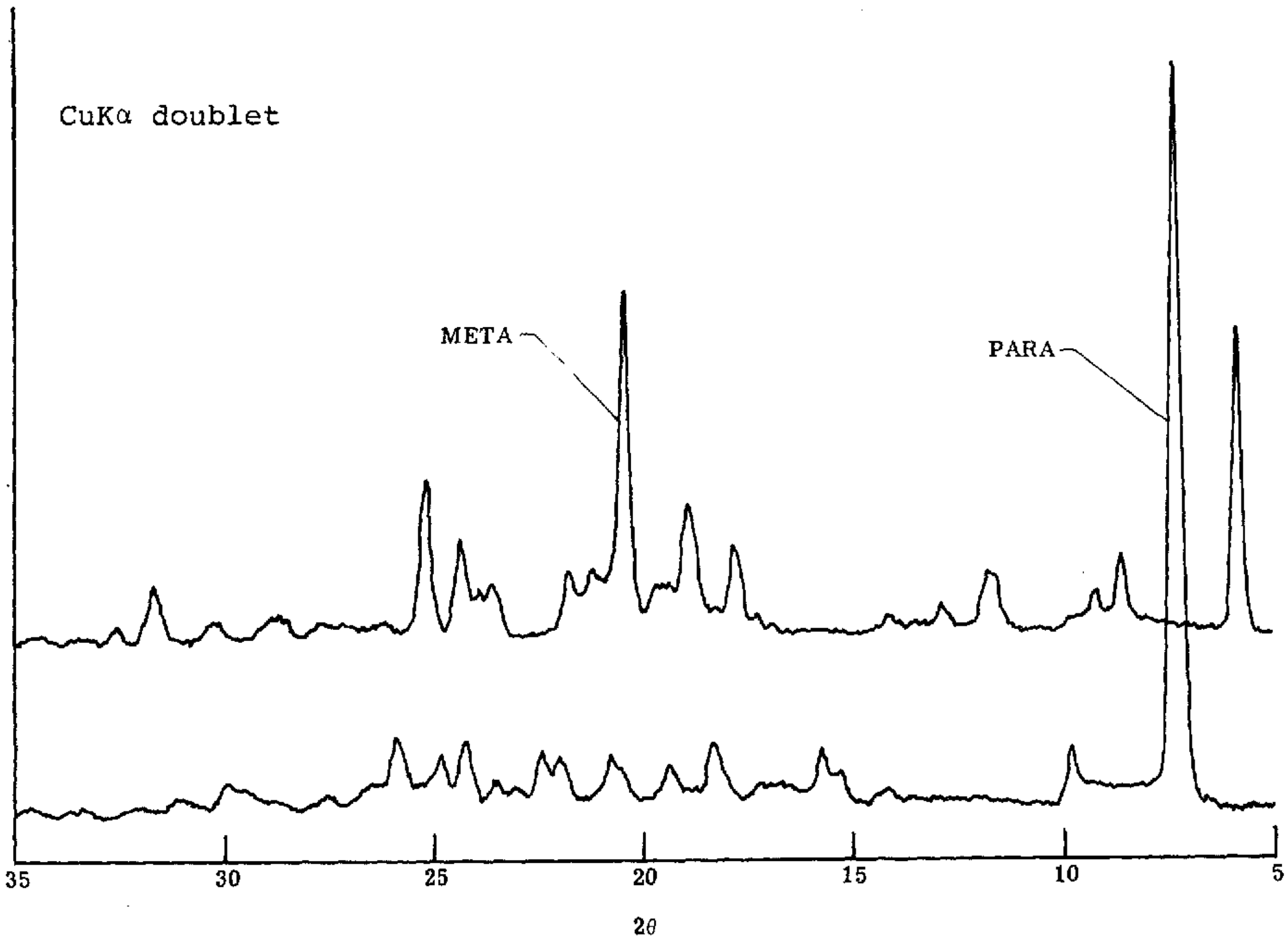


Figure 26.- X-ray powder diffractograms of specimens of the PARA and META isomers annealed at 170°C for 24 hours.

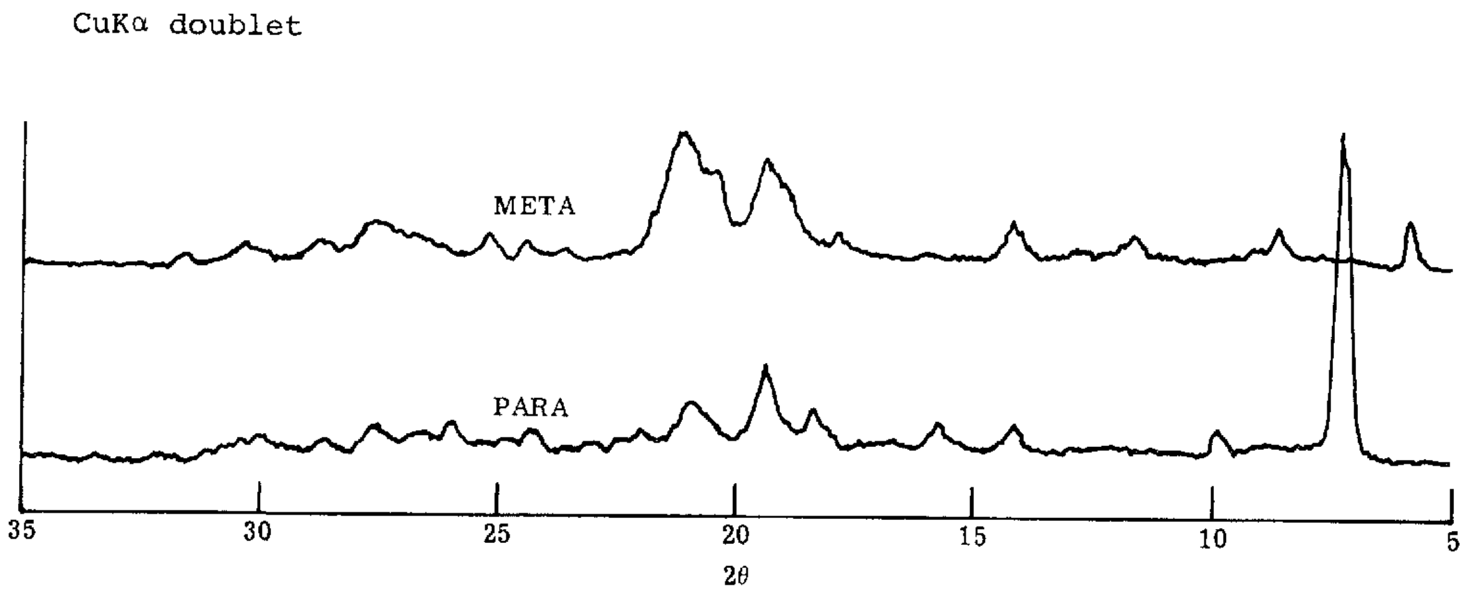


Figure 27.- X-ray powder diffractograms of specimens of the PARA and META isomers annealed at 170°C for 72 hours.

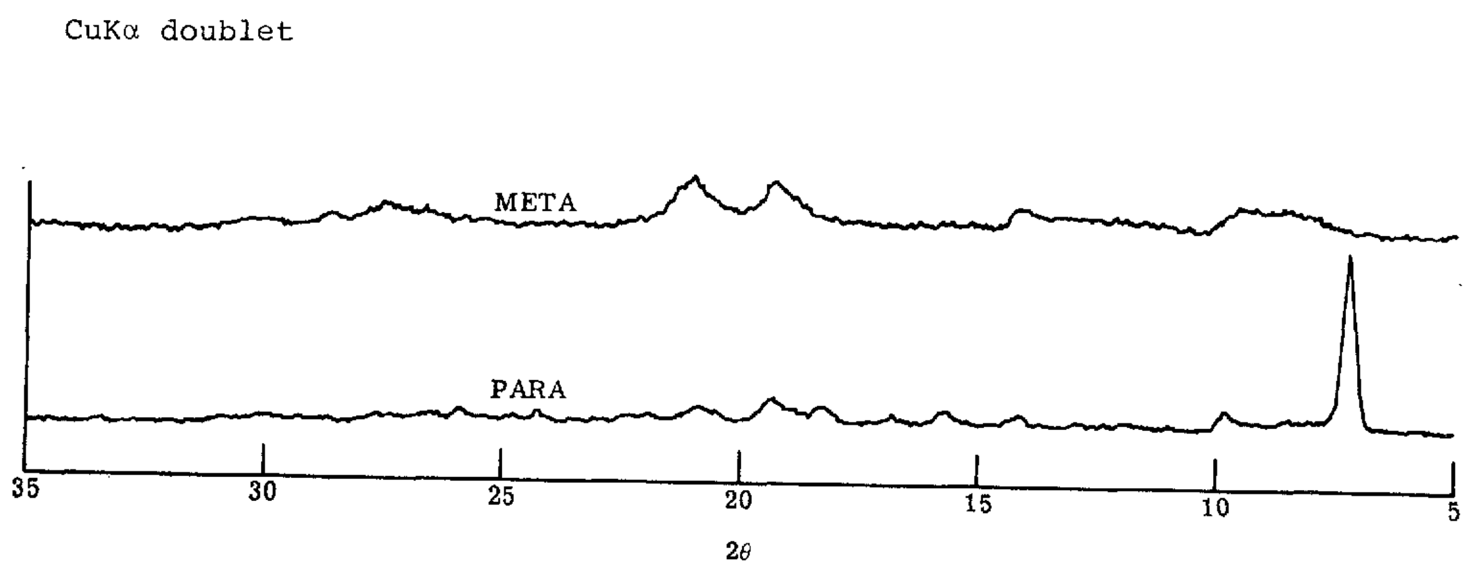


Figure 28.- X-ray powder diffractograms of specimens of the PARA and META isomers annealed at 170°C for 120 hours.

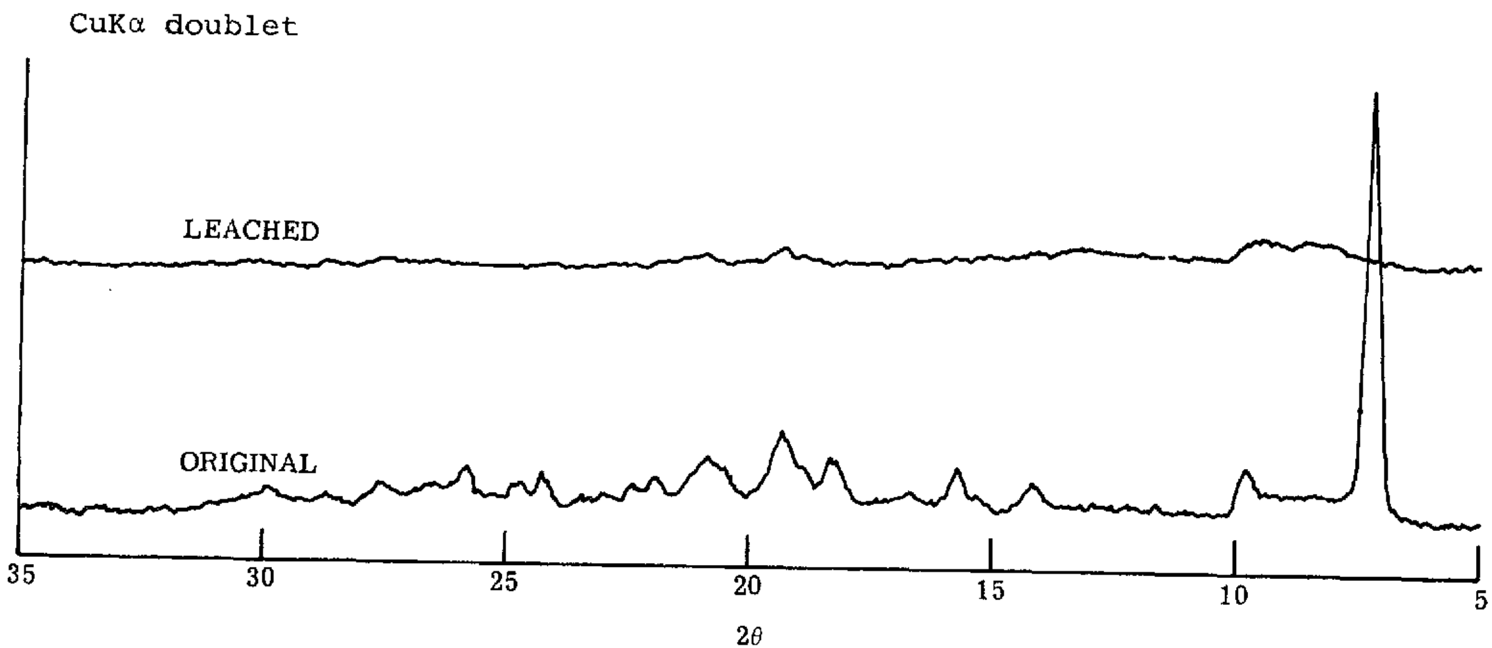


Figure 29.- X-ray powder diffractograms of specimens of the PARA isomer, annealed at 170°C for 120 hours, original and after Soxhlet Extraction.

addition to this region there are peaks in the diffractograms for these specimens in regions where the solution cast material displays a flat background.

The thought being that the deviations from the broad, glass-like, pattern of the amorphous film material suggestive of residual crystallinity might be those of residual unreacted starting material, a 170°C, 120 hour para specimen was subjected to soxhlet extraction. In soxhlet extraction a solid is repeatedly bathed in liquid in which one or more of its constituents is soluble by use of a reflux condensing geometry. The unpolymerized material is completely soluble in the hot water/isopropyl alcohol solvent used in the extraction. Whether the 24 hour extraction, in addition to removing unreacted material, would damage the order of the insoluble polymer or further its crystallization is unknown, but the former is believed since the temperature of the boiling mixture is lower than the annealing temperature and its constitution should drive the depolymerization reaction. It is estimated visually that greater than one half and less than two thirds of the specimen was returned to the round bottom flask.

The solid remaining after extraction, while smaller than that normally used in the powder diffractometry determinations, was placed in a special sample holder and the

powder pattern taken. Leached and unleached patterns are displayed in Figure 29. With the scale set such that an unleached peak would have been increased, the small leached specimen displays the multiple peaks in the region of the amorphous halo that are indicative of crystallinity. The conclusion is that crystalline polymer is present.

Thermal Gravimetric Analysis. One common method of estimating the high temperature performance of a polymer is that of Thermal Gravimetric Analysis (TGA), in which specimens are heated in air and/or in vacuo and their weight change with time recorded. The air testing can be thought of as, in essence, a measurement of crystallinity since weight loss can be associated with ease of diffusion of oxidant into the material and ease of diffusion of oxidation products out of the material, thus a well ordered and tightly packed lattice, in effect a crystalline one, should display less reducible surface area to the oxidant.

Figure 30 displays the weight fraction lost for para and meta 170°C, 72 hour, specimens heated in static air with a heating rate of 5°C/min. A static air TGA experiment is one in which a small opening at the top of the containment tube allows loss of material to the atmosphere and the tendency toward equilibration of pressure but does not represent the severity of a flowing air test in which openings

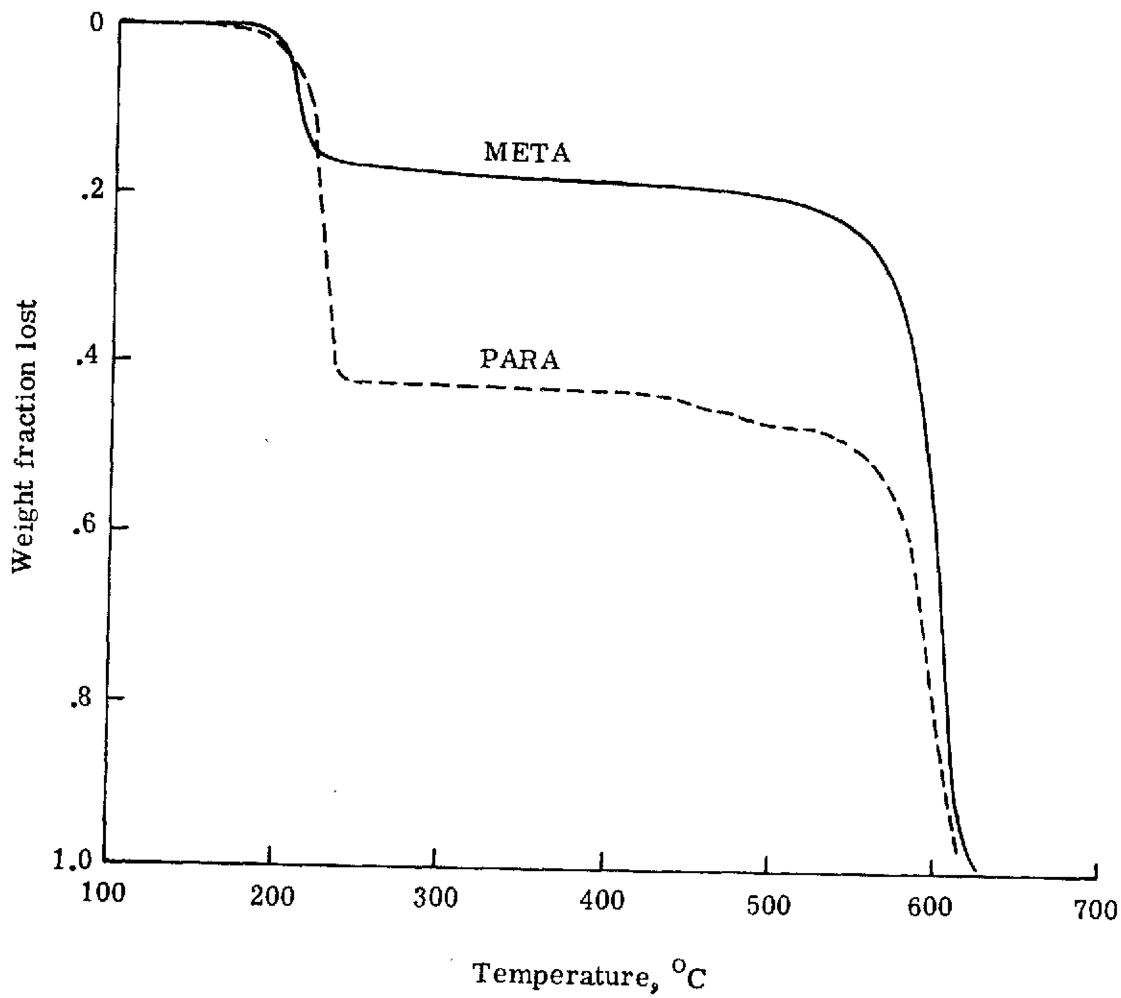


Figure 30.- Weight fraction lost versus temperature (°C) for PARA and META open tube specimens, annealed at 170°C for 72 hours, and subjected to a static air TGA experiment with a heating rate of 5°C/min.

are present at both top and bottom. The meta isomer proves more stable in this TGA experiment than the para, for the stated annealing condition, and the implication is that it is thus the more crystalline specimen.

Single Crystal Diffractometry. In an effort to learn the starting geometry of the isomers and perhaps thereby discern the meaning of the two DTA endotherms as well as determine if the isomeric structures were such that it would be conceivable that they could be amenable to topochemical polymerization, crystals of the isomers were examined under a microscope while mounted to a goniometer which could be rotated during the examination. Both appeared to possess monoclinic morphology. The para isomer was present as extremely thin plates while the meta isomer, although consisting of small crystals, was rod-like and thus more amenable to diffraction analysis. A small meta single crystal was found and precession camera photographs with Ni-filtered CuK radiation showed that it belonged to the monoclinic space group 14 (systematic absences: $h0\ell$ with $(h+\ell)$ odd, $0k0$ with k odd). The axes were defined such that the space group was $P2_1/n$ in order to obtain a unit cell with a β-angle close to 90°. Although this orientation is very common in the crystallographic literature for organic crystals, it is non-standard from the viewpoint of the International

Tables for X-Ray Crystallography[35] and the following equipoint set and geometrical structure factors were calculated for $P2_1/n$:

x, y, z

$\bar{x}, \bar{y}, \bar{z}$

$\bar{x}-1/2, y+1/2, \bar{z}-1/2$

$x+1/2, \bar{y}-1/2, z+1/2$

for $(h + k + \ell)$ even

$$A = 4 \cos 2\pi(hx + \ell z) \cos 2\pi ky$$

for $(h + k + \ell)$ odd

$$A = -4 \sin 2\pi(hx+\ell z) \sin 2\pi ky$$

The mounted crystal was taken to the automatic Picker Single Crystal X-Ray Diffractometer at the University of Virginia where the intensities of a quadrant of reflections were measured (h: 11 to -12; k: 28 to 0; ℓ: 5 to 0) out to sin θ/lambda = .4736 using Mo - radiation. A graphite monochromator was used with a setting angle of 11.52° ($2\theta_m$). To check electronic and crystal stability during the period of data collection, the intensities of standard reflections (200, 080, 002) were measured every 60th reflection. No systematic variation was observed for these standard intensities. The master card program for the diffractometer provided the following unit cell data:

a = 12.7127Å Beta = 101.53°

b = 30.1615Å

c = 6.0594Å

Volume = 2276.50 cubic angstroms

The x-ray density of the meta crystal, calculated from the above measured unit cell parameters for four acid-base pairs per cell, is 1.30 g/ml as compared to 1.22 g/ml by commercial floatation analysis. (Commercial analysis for the para isomer: 1.57 g/ml.)

An overall isotropic temperature factor (B = 1.986) and scale factor (K = 15.9142) were calculated using a Wilson plot contained in the NORMSF overlay of the X-Ray System of Crystallographic Programs.[36] Of the 2350 recorded reflections, 70 are systematically extinct, leaving 2280 of which 1494 are designated observed reflections and 786 "less-thans".[37] Measured intensity varied from 0 to 2972 and relative structure factors from .38 to 24.1. The highest intensity reflection was 080 implying that the 8 planar benzene nuclei were arranged normal to be b-axis and this is in accord with the magnitudes of the unit cell dimensions. Table I contains the statistics and distribution for the normalized structure factors (E). Appendix A is a listing of 2280 relative and normalized structure factors.

TABLE 1.- STATISTICS AND DISTRIBUTION OF NORMALIZED STRUCTURE FACTORS

	THEORETICAL		EXPERIMENTAL							
AVERAGE VALUE	CENTRIC	ACENTRIC	$\|E1\|$		$\|E2\|$		$\|E3\|$		$\|E4\|$	
$\|E\|$	.798	.886		.706		.559		.706		.556
$\|E^2\|$	1.000	1.000		1.000		1.021		1.000		1.018
$\|E^2 - 1\|$	.968	.736		1.060		1.356		1.061		1.354
$\|E\|$ GT. 3.0	.27	.01	12	.51	43	1.87	8	.33	38	1.67
$\|E\|$ GT. 2.5	1.24	.19	34	1.45	76	3.32	33	1.45	74	3.25
$\|E\|$ GT. 2.0	4.55	1.83	110	4.77	161	7.02	108	4.72	160	6.97
$\|E\|$ GT. 1.8	7.19	3.92	165	7.20	227	9.87	172	7.51	215	9.38
$\|E\|$ GT. 1.6	10.96	7.73	262	11.48	303	13.19	260	11.39	287	12.54
$\|E\|$ GT. 1.4	16.15	14.09	377	16.51	369	16.09	368	16.15	355	15.46
$\|E\|$ GT. 1.2	23.01	23.69	531	23.26	466	20.34	533	23.37	457	19.96
$\|E\|$ GT. 1.0	31.73	36.79	724	31.71	593	25.94	722	31.66	588	25.74
$\|E\|$ GT. 0.0	100.00	100.00	2280	100.00	2280	100.00	2280	100.00	2280	100.00

Note: $|E1|$ is calculated with an overall scale factor while $|E2|$ is calculated with scale factors representative of different intervals of $\sin^2 \theta/\lambda^2$. $|E3|$ and $|E4|$ are $|E1|$ and $|E2|$, respectively, with anisotropic corrections applied. Further information is contained in Appendix A.

Before the X-Ray System of Crystallographic Programs (CRYSPAK) became available in this laboratory a series of programs, including those for data reduction, Wilson plot-Zero Moment Test, Fourier and Patterson Map, were written. The data reduction program contained the correction for monochromator angle to the Lorentz and polarization corrections.[38] The result of the Zero Moment Test[39], which involves the determination of the fraction, N(Z), of the reflections less than a specified fraction of the average intensity and which is based upon the fact that centrosymmetric crystals tend to have more weak or unobserved reflections than noncentrosymmetric ones, is shown in Figure 31 along with the theoretical distributions. It is estimated that the calculated distribution of intensities more nearly matches that of the theoretical curve for the centrosymmetric case.

The in-house data reduction program generated the following statistics and distribution of normalized structure factor information as compared to the CRYSPAK generated information in Table I:

	A	B
Average value of $\lvert E \rvert$	.611	.688
Average value of $\lvert E^2 - 1 \rvert$	.942	.896

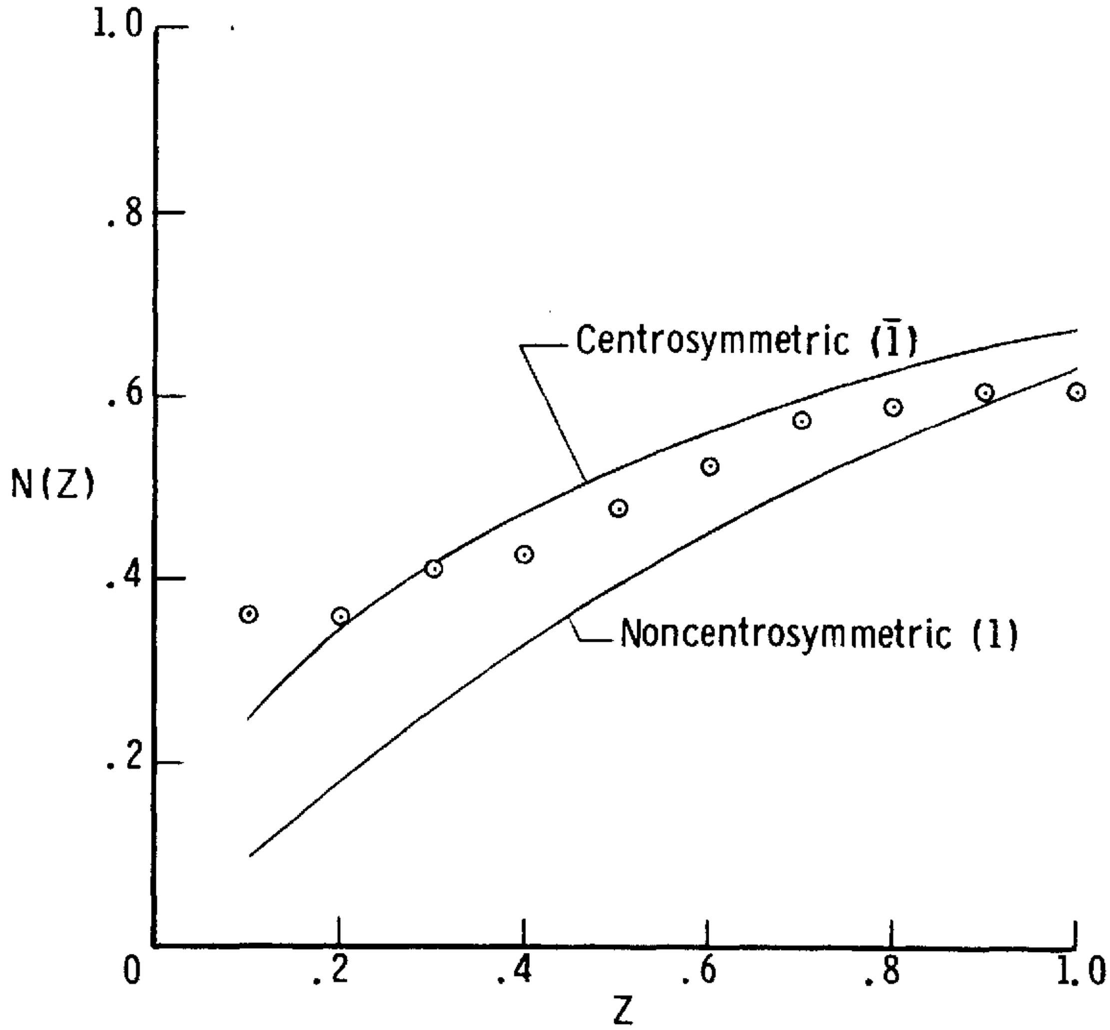


Figure 31.- Zero-moment test.

	A	B
$\lvert E \rvert$ GT. 1.0	25.00	24.11
$\lvert E \rvert$ GT. 2.0	2.50	2.34
$\lvert E \rvert$ GT. 3.0	.30	.30

A = zero intensity data left as zero

B = zero intensity data expressed as $I_{min}/3.0$ (ref. 37)

The general implication of the above, coupled with Table I, is that the data possesses a centric distribution or perhaps even hypercentric distribution[40], the latter conclusion being challenged by the zero moment test (Figure 31).

Preliminary to the use of direct methods, a mechanized trial-and-error scheme based upon a modified ORFLS[41] program was employed. As mentioned previously, there is reason to believe that at least one of the six-membered rings was parallel, or almost so, to the *ac* plane. The subset of $h0\ell$ data was used to find the minimum residual position for a ring, oriented with respect to the x-axis, in this plane. The minimum residual positions of arbitrarily oriented rings in *ac* space are shown in

figure 32. The other half of the cell face is produced by the indicated centers. The minimum residual obtained in xyz space, using the fact that the origin of this space group can be moved to any center to reduce the computation, for the rings taken pairwise, is for the following position:

1a	-.00747	.07825	.84825	1b	.24267	.19429	.59741
2a	.02840	.07825	.64477	2b	.27854	.19429	.39393
3a	.13812	.07825	.64477	3b	.38826	.19429	.39393
4a	.21199	.07825	.84825	4b	.46213	.19429	.59741
5a	.17612	.07825	1.05173	5b	.42626	.19429	.80089
6a	.06640	.07825	1.05173	6b	.31654	.19429	.80089

Application of the two-fold screw and the n-glide would spread eight rings in a sensible manner along the long y-axis based upon the measured minimum residual positions at y = .07825 and .19429. Unfortunately, this trial structure, representing 12/32 of the whole, failed to refine with application of the standard Fourier methods; however, the ring at y = .19429 did re-orient with respect to the x and y axes such as to be recognizable in this new position in various direct methods E-maps. Also, the general drift of matter in the E-maps corresponds to that observed in this trial and error porcess by molecules a and b.

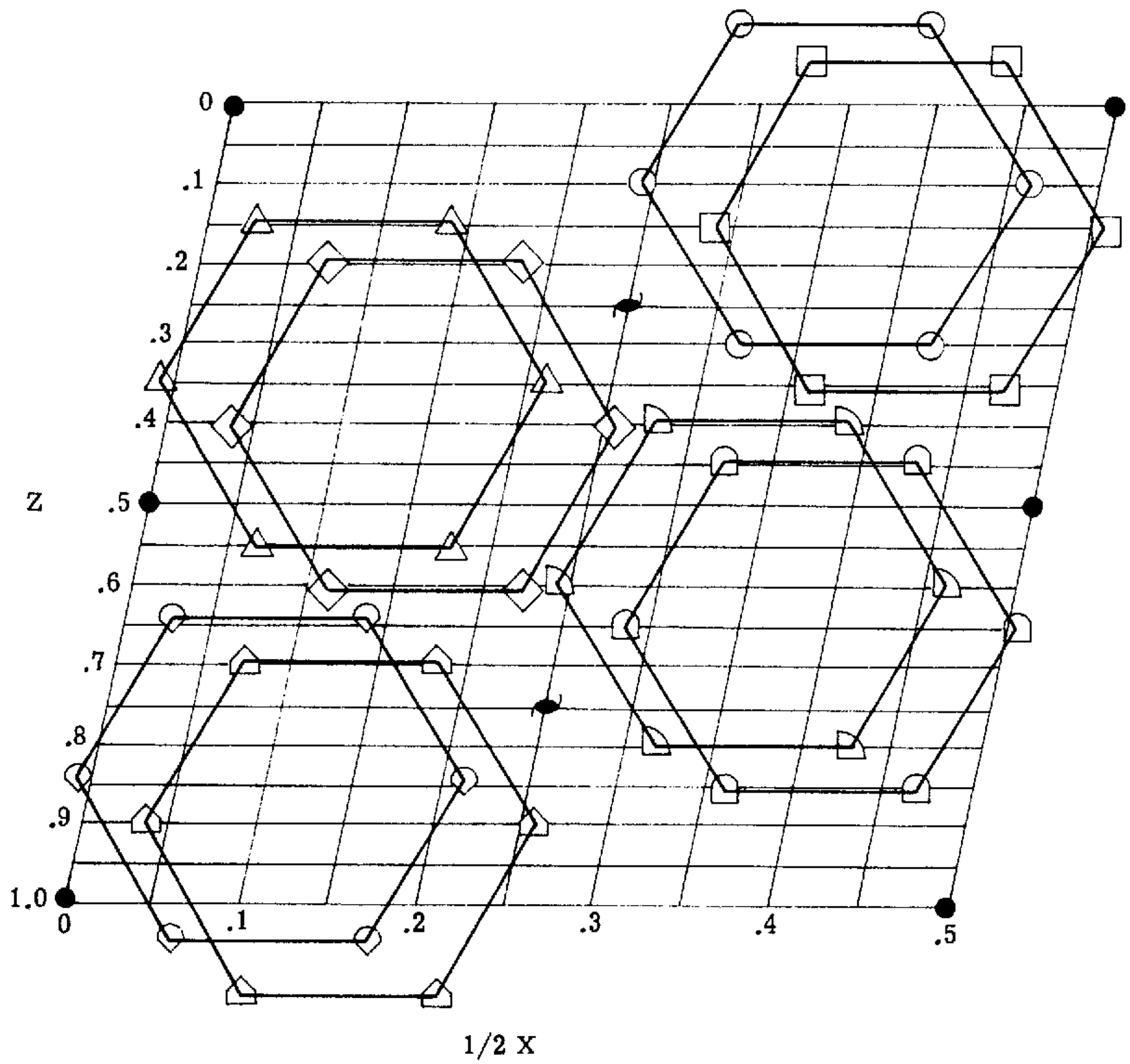


Figure 32.- Minimum residual rings in *ac* plane.

The centrosymmetric direct methods programs used were the PHASE overlay of CRYSPAK and the LONGS[42] multiple solution computer program, based on the reiterative application of Sayre's equation.[43] After much variation of the parameters of the various direct methods programs similar *E*-maps were obtained. All calculations from intensity data to final *E*-maps for the CRYSPAK study were made with the various overlayed programs of CRYSPAK while all calculations with the exception of the LONGS phasing for the LONGS study were with in-house written programs. Rings taken from the two independent studies are listed below:

	CRYSPAK				LONGS		
1c	.26542	.20947	.57222	1L	.26486	.20000	.53526
2c	.33232	.19087	.38889	2L	.32187	.20074	.37731
3c	.44781	.20333	.51006	3L	.43849	.22785	.49949
4c	.48373	.19855	.72756	4L	.48333	.20833	.72917
5c	.43133	.20128	.86677	5L	.41814	.19167	.84105
6c	.31833	.19776	.78312	6L	.29461	.22346	.76786

The coincidence of a ring at $y \approx .20$ between the direct methods and the trial-and-error method was encouraging; however, the *E*-maps suggested that the other molecule ($y \approx .08$) was not parallel to the *ac* plane but was roughly

parallel to the y-axis, although oriented in x and z along the drift line of molecules a and b of the trial-and-error calculation. This molecule apparently extended from $y \simeq .06$ almost up to the one at $y \approx .20$. This would make chemical sense in that an infinite chain of alternating acid and base parts would extend through the material in proper position to "zip" up to form polymer. It was also presumed that this lower (in y) molecule was a pyromellitic ester making the molecule at $y = .20$ a phenylene diamine.

Coordinates of the nuclear carbon atoms of the lower molecule, taken from the CRYSPAK E-map are given below along with those of the four nuclear-bonded side chain carbons:

P1	.84917	.16726	1.03125				
P2	.76919	.13402	1.05704	C2	.69167	.15942	1.13237
P3	.76413	.08956	1.02431	C3	.69769	.06250	1.15972
P4	.83199	.05951	.94384				
P5	.91649	.08686	.88715	C5	.97911	.06235	.69514
P6	.89896	.13440	.84954	C6	.97193	.17622	.71278

These together with the upper molecule would refine with ORFLS least squares to a residual of about .4. This is indicative of much error in the trial structure.

The regions of the E-maps where the two molecules were chosen presented a multiplicity of choices for benzene rings, overlaping, with the apex of one ring in the center of another while sharing two other carbons. The geometry of the positions of the two nitrogens in the upper molecule and the 4 carbons in the lower molecular fell in with the overlaping pattern. Calculations of the residual for a large variety of alternate rings failed to provide a better choice of trial structure. Use of the TANGEN overlay of CRYSPAK, which allows biasing of the sign determination by specifying certain signs from a structure factor calculation from atom input, only produced substantially similar E-maps at best. Choices of nitrogen atoms for the upper molecule could not be made because of lack of sensitivity of the residual calculation and the ambiguity of the ring locations. Atom locations for the ester and acid oxygen and carbon atoms could be made in reasonable positions, and did lower the residual, but did not refine satisfactorily. The answer appeared to lie in the recently discovered fact that E-maps which fail to produce refineable trial structures often yield a correct asymmetric unit, but one incorrectly aligned to the origin.[44,45,46]

To detach the calculation from a choice of origin, an extra quadrant of data was generated by use of the monoclinic

mirror and calculations begun, also using the TANGEN overlay, in the space group, P1. Groups of atoms, rings, pairs of rings, and alternates were all input. An input ring, in addition to itself would produce its shifted alternate, both in the input volume and in volumes produced by inherent symmetry operations. It was evident that the data contained inherent *n*-glide planes and screw axes, shifted slightly, but basically as had been presumed. Since alternate, overlayed rings, were always produced and since least squares proved too insensitive to discriminate between them the problem proved intractable within the context of the available resources.

The implication of this study is that the asymmetric unit contains a pyromellitic acid-ester and a phenylene diamine molecule, roughly as defined by the given coordinates, with molecular relationships within the unit being approximate, but descriptive, but with the relationship of the unit pair to the origin being unknown.

CHAPTER IV

CONCLUSION

The meta and para starting materials (phenylene diamine and di-isopropyl ester of pyromellitic acid) appear not to be salts in the unannealed solid state. However, there is evidence for a partial ionization of the para isomer, which may explain the observation of a more rapid initial imidization for this material.

While there is no clear evidence for the involvement of an amide stage, there is evidence of the possible participation of a salt intermediate. The use of evacuated sealed tubes may be a way of obtaining the optimum temperature of annealing for the imidization without loss of needed material before it has had the time to undergo the required solid state rearrangement.

The reaction which appears to be essentially complete after 3 days, as judged by water/alcohol loss, does not yield the desired infrared spectra of the imide polymer, implying the necessity of longer annealing times and higher temperatures for the purpose of solid state rearrangement. At the lower temperature (130°C) the chemical reaction appears to be governed by a parabolic diffusion rate. A comparison of the time-temperature data for the onset of

loss of the first and second DTA endotherms with infrared spectral data denoting the appearance of definite imide bands and complete loss of ester character follows for the open tube specimens:

	TEMP. °C	LOSS OF FIRST ENDOTHERM	LOSS OF SECOND ENDOTHERM	IMIDE BANDS	COMPLETE LOSS ~3000cm^{-1}
PARA	120				
	130	72-120 hrs.			
	140	48-72 hrs.		X*	
	150	<24 hrs.		X	
	160	<24 hrs.		X	
	170	<24 hrs.		X	
META	120				
	130	72-120 hrs.			
	140	48-72 hrs.			
	150	<24 hrs.			
	160	<24 hrs.		X	
	170	<24 hrs.	X	X	X

*Observed

Through the use of powder X-ray diffractometry it has been established that the material, which infrared analysis has shown to contain bands characteristic of the imide linkage, has been polymerized in the solid state to a form

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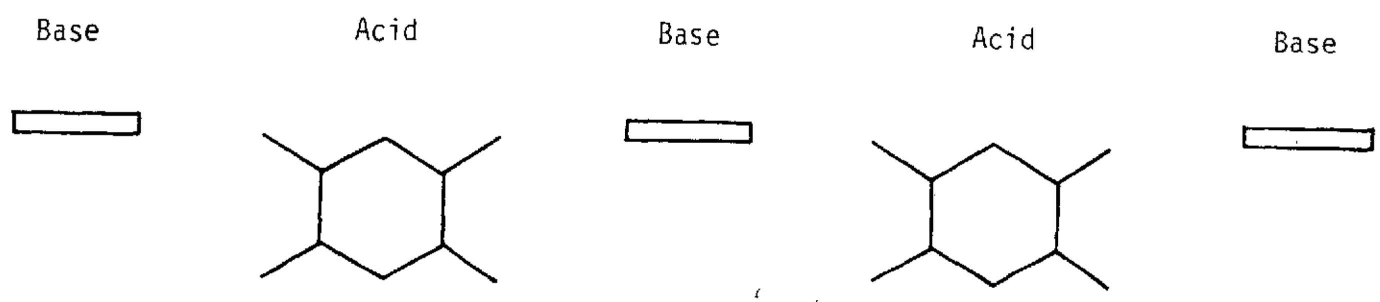

Figure 33.- Representation of molecular orientation of acid and base parts of precursor salt.

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Appendix A

Listing of 2280 relative and normalized structure

Factors. (JCODE: 1, observed; 2, less-thans.)

OVERALL TEMPERATURE FACTORS AND SCALES TO BE USED IN THE CALCULATION OF NORMALIZED STRUCTURE FACTORS

LEAST SQUARES VALUES USED TO CALCULATE E(1) --

OVERALL ISOTROPIC T.F. B = 1.986 OVERALL FREL SCALE K = 15.9142 DK = .8464

K - CURVE VALUES USED TO CALCULATE E(2) --

FREL FACTOR IF S2T/L2 FROM 0.00 TO .16 (INTERVAL = 0.01) DK = 1.3297

15.5202	14.9352	14.3722	13.8305	13.3091	17.5702
15.7871	20.7303	19.3444	20.3840	18.4953	19.4826
22.4868	20.8119	21.8141	25.9284		

ANISOTROPIC CORRECTIONS TO E(1) FOR CALCULATION OF E(3) --

DB11	DB12	DB13	DB22	DB23	DB33	DK
-.00007	.00074	.00042	.00003	.00176	-.00213	.8340

ANTISOTROPIC CORRECTIONS TO E(2) FOR CALCULATION OF E(4) --

DB11	DB12	DB13	DB22	DB23	DB33	DK
-.00167	.00185	-.01318	-.00038	.00694	-.02583	1.4289

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1	-10	0	0	1	2	.1611	1.407	.714	0.000	.699	0.000
2	-8	0	0	1	2	.1031	1.231	.449	.679	.440	.656
3	-6	0	0	1	2	.0580	6.978	1.777	2.524	1.747	2.554
4	-4	0	0	1	2	.0258	.690	.125	.165	.123	.172
5	-2	0	0	1	2	.0064	4.465	.623	.920	.614	.982
6	2	0	0	1	2	.0064	3.720	.519	.766	.511	.818
7	4	0	0	1	2	.0258	1.195	.216	.285	.213	.299
8	6	0	0	1	2	.0580	5.741	1.462	2.076	1.437	2.101
9	8	0	0	2	2	.1031	0.000	0.000	0.000	0.000	0.000
10	10	0	0	1	2	.1611	1.407	.714	0.000	.699	0.000
11	11	1	0	2	1	.1952	0.000	0.000	0.000	0.000	0.000
12	10	1	0	1	1	.1614	.813	.584	0.000	.576	0.000
13	9	1	0	2	1	.1308	0.000	0.000	0.000	0.000	0.000
14	8	1	0	1	1	.1034	1.423	.735	1.113	.725	1.090
15	7	1	0	1	1	.0792	1.142	.494	.810	.487	.812
16	6	1	0	1	1	.0583	4.019	1.451	2.054	1.433	2.100
17	5	1	0	1	1	.0406	1.555	.472	.582	.466	.605
18	4	1	0	2	1	.0261	0.000	0.000	0.000	0.000	0.000
19	3	1	0	2	1	.0148	0.000	0.000	0.000	0.000	0.000
20	2	1	0	1	1	.0067	.848	.168	.248	.166	.265
21	1	1	0	1	1	.0019	1.257	.231	.350	.228	.376
22	-1	1	0	1	1	.0019	2.133	.392	.594	.386	.636
23	-2	1	0	2	1	.0067	0.000	0.000	0.000	0.000	0.000
24	-3	1	0	1	1	.0148	1.268	.281	.396	.277	.416
25	-4	1	0	1	1	.0261	.979	.251	.331	.247	.344
26	-5	1	0	1	1	.0406	1.904	.578	.713	.566	.728
27	-6	1	0	1	1	.0583	4.809	1.736	2.457	1.699	2.458
28	-7	1	0	1	1	.0792	2.285	.987	1.619	.964	1.582
29	-8	1	0	2	1	.1034	0.000	0.000	0.000	0.000	0.000
30	-9	1	0	1	1	.1308	.762	.467	.742	.454	.685
31	-10	1	0	1	1	.1614	.813	.584	0.000	.567	0.000
32	-11	1	0	1	1	.1952	1.930	1.617	0.000	1.566	0.000
33	-11	2	0	1	1	.1961	1.222	1.028	0.000	.988	0.000
34	-10	2	0	1	1	.1622	1.151	.831	0.000	.801	0.000
35	-9	2	0	1	1	.1316	1.080	.664	1.059	.642	.960
36	-8	2	0	1	1	.1042	1.887	.980	1.487	.950	1.392
37	-7	2	0	1	1	.0801	1.620	.705	1.148	.685	1.106
38	-6	2	0	1	1	.0591	3.598	1.309	1.833	1.275	1.811
39	-5	2	0	1	1	.0414	.553	.169	.214	.165	.216
40	-4	2	0	1	1	.0269	4.068	1.056	1.383	1.033	1.424
41	-3	2	0	1	1	.0156	1.422	.319	.446	.313	.467
42	-2	2	0	1	1	.0075	3.510	.704	1.032	.692	1.092

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
85	-4	4	0	1	1	.0302	1.969	.532	.684	.518	.690
86	-3	4	0	1	1	.0189	3.546	.831	1.140	.811	1.173
87	-2	4	0	1	1	.0108	1.353	.285	.409	.279	.428
88	-1	4	0	1	1	.0060	4.079	.800	1.183	.786	1.253
89	0	4	0	1	2	.0044	3.504	.474	.708	.467	.756
90	1	4	0	1	1	.0060	4.242	.832	1.231	.822	1.322
91	2	4	0	1	1	.0108	1.296	.272	.392	.270	.422
92	3	4	0	1	1	.0189	3.686	.864	1.186	.859	1.275
93	4	4	0	1	1	.0302	1.833	.495	.636	.493	.682
94	5	4	0	1	1	.0447	2.110	.668	.924	.667	.982
95	6	4	0	1	1	.0624	.617	.231	.343	.232	.360
96	7	4	0	2	1	.0833	0.000	0.000	0.000	0.000	0.000
97	8	4	0	1	1	.1075	2.276	1.208	1.853	1.214	1.887
98	9	4	0	1	1	.1349	1.333	.835	1.343	.840	1.339
99	10	4	0	2	1	.1655	0.000	0.000	0.000	0.000	0.000
100	11	4	0	2	1	.1994	0.000	0.000	0.000	0.000	0.000
101	11	5	0	2	1	.2018	0.000	0.000	0.000	0.000	0.000
102	10	5	0	2	1	.1680	0.000	0.000	0.000	0.000	0.000
103	9	5	0	1	1	.1374	2.047	1.300	2.105	1.317	2.127
104	8	5	0	1	1	.1100	2.173	1.173	1.813	1.185	1.867
105	7	5	0	1	1	.0858	2.698	1.227	2.038	1.237	2.133
106	6	5	0	2	1	.0649	0.000	0.000	0.000	0.000	0.000
107	5	5	0	1	1	.0472	.991	.322	.473	.323	.506
108	4	5	0	1	1	.0327	1.942	.540	.684	.540	.736
109	3	5	0	1	1	.0214	.805	.195	.263	.194	.284
110	2	5	0	1	1	.0133	1.089	.237	.336	.235	.362
111	1	5	0	2	1	.0085	0.000	0.000	0.000	0.000	0.000
112	-1	5	0	2	1	.0085	0.000	0.000	0.000	0.000	0.000
113	-2	5	0	1	1	.0133	1.365	.297	.421	.291	.437
114	-3	5	0	1	1	.0214	1.315	.318	.430	.310	.439
115	-4	5	0	1	1	.0327	1.871	.520	.659	.505	.658
116	-5	5	0	2	1	.0472	0.000	0.000	0.000	0.000	0.000
117	-6	5	0	2	1	.0649	0.000	0.000	0.000	0.000	0.000
118	-7	5	0	1	1	.0858	1.349	.614	1.019	.588	.937
119	-8	5	0	1	1	.1100	2.402	1.296	2.004	1.235	1.780
120	-9	5	0	1	1	.1374	.774	.491	.796	.466	.680
121	-10	5	0	2	1	.1680	0.000	0.000	0.000	0.000	0.000
122	-11	5	0	1	1	.2018	.873	.751	0.000	.705	0.000
123	-11	6	0	2	1	.2049	0.000	0.000	0.000	0.000	0.000
124	-10	6	0	2	1	.1710	0.000	0.000	0.000	0.000	0.000
125	-9	6	0	1	1	.1404	.779	.503	.825	.474	.691
126	-8	6	0	1	1	.1130	1.788	.984	1.582	.933	1.379

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
127	-7	6	0	1	1	.0888	4.620	2.150	3.605	2.048	3.257
128	-6	6	0	1	1	.0679	1.672	.658	1.117	.630	1.043
129	-5	6	0	1	1	.0502	1.008	.337	.528	.325	.508
130	-4	6	0	1	1	.0357	3.564	1.026	1.277	.993	1.260
131	-3	6	0	1	1	.0244	1.443	.363	.483	.353	.487
132	-2	6	0	1	1	.0163	3.831	.868	1.209	.849	1.245
133	-1	6	0	1	1	.0115	8.157	1.731	2.481	1.700	2.596
134	0	6	0	2	2	.0099	0.000	0.000	0.000	0.000	0.000
135	1	6	0	1	1	.0115	8.469	1.797	2.576	1.781	2.756
136	2	6	0	1	1	.0163	3.603	.816	1.138	.812	1.225
137	3	6	0	1	1	.0244	1.273	.320	.426	.320	.459
138	4	6	0	1	1	.0357	3.318	.955	1.188	.957	1.282
139	5	6	0	2	1	.0502	0.000	0.000	0.000	0.000	0.000
140	6	6	0	2	1	.0679	0.000	0.000	0.000	0.000	0.000
141	7	6	0	1	1	.0888	4.670	2.173	3.644	2.203	3.846
142	8	6	0	2	1	.1130	0.000	0.000	0.000	0.000	0.000
143	9	6	0	1	1	.1404	2.698	1.741	2.859	1.777	2.925
144	10	6	0	1	1	.1710	1.851	1.392	0.000	1.425	0.000
145	11	6	0	1	1	.2049	1.753	1.529	0.000	1.569	0.000
146	11	7	0	1	1	.2084	1.247	1.103	0.000	1.142	0.000
147	10	7	0	2	1	.1746	0.000	0.000	0.000	0.000	0.000
148	9	7	0	1	1	.1440	1.922	1.265	2.199	1.299	2.277
149	8	7	0	1	1	.1166	3.456	1.945	3.269	1.991	3.437
150	7	7	0	1	1	.0924	1.823	.871	1.426	.888	1.517
151	6	7	0	2	1	.0715	0.000	0.000	0.000	0.000	0.000
152	5	7	0	1	1	.0537	1.325	.459	.688	.464	.742
153	4	7	0	2	1	.0392	0.000	0.000	0.000	0.000	0.000
154	3	7	0	1	1	.0280	.705	.185	.241	.186	.261
155	2	7	0	1	1	.0199	1.514	.359	.490	.358	.527
156	1	7	0	1	1	.0151	1.344	.299	.420	.297	.448
157	-1	7	0	1	1	.0151	1.590	.354	.497	.348	.517
158	-2	7	0	1	1	.0199	.913	.217	.296	.212	.302
159	-3	7	0	2	1	.0280	0.000	0.000	0.000	0.000	0.000
160	-4	7	0	2	1	.0392	0.000	0.000	0.000	0.000	0.000
161	-5	7	0	1	1	.0537	2.053	.711	1.066	.682	1.010
162	-6	7	0	2	1	.0715	0.000	0.000	0.000	0.000	0.000
163	-7	7	0	1	1	.0924	.689	.329	.539	.312	.478
164	-8	7	0	1	1	.1166	3.757	2.114	3.554	1.993	3.036
165	-9	7	0	2	1	.1440	0.000	0.000	0.000	0.000	0.000
166	-10	7	0	1	1	.1746	1.666	1.274	0.000	1.185	0.000
167	-11	7	0	1	1	.2084	2.924	2.588	0.000	2.391	0.000
168	-11	8	0	1	1	.2126	1.537	1.383	0.000	1.268	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
169	-10	8	0	1	1	.1787	2.220	1.730	0.000	1.598	0.000
170	-9	8	0	1	1	.1481	2.239	1.505	2.784	1.401	2.232
171	-8	8	0	1	1	.1207	1.665	.961	1.669	.901	1.397
172	-7	8	0	2	1	.0965	0.000	0.000	0.000	0.000	0.000
173	-6	8	0	1	1	.0756	1.722	.723	1.225	.687	1.107
174	-5	8	0	1	1	.0579	2.006	.721	1.026	.690	.959
175	-4	8	0	1	1	.0434	1.769	.553	.738	.532	.710
176	-3	8	0	1	1	.0321	3.653	1.009	1.283	.978	1.268
177	-2	8	0	1	1	.0240	5.868	1.469	1.957	1.433	1.980
178	-1	8	0	1	1	.0192	10.467	2.463	3.374	2.417	3.480
179	0	8	0	1	2	.0176	24.098	3.926	5.430	3.875	5.694
180	1	8	0	1	1	.0192	10.670	2.510	3.439	2.493	3.655
181	2	8	0	1	1	.0240	5.769	1.445	1.925	1.443	2.065
182	3	8	0	1	1	.0321	3.653	1.009	1.283	1.014	1.385
183	4	8	0	2	1	.0434	0.000	0.000	0.000	0.000	0.000
184	5	8	0	1	1	.0579	2.263	.814	1.158	.826	1.254
185	6	8	0	1	1	.0756	2.159	.906	1.536	.924	1.657
186	7	8	0	1	1	.0965	1.395	.687	1.072	.704	1.149
187	8	8	0	2	1	.1207	0.000	0.000	0.000	0.000	0.000
188	9	8	0	1	1	.1481	1.371	.922	1.705	.954	1.784
189	10	8	0	1	1	.1787	1.454	1.133	0.000	1.177	0.000
190	11	8	0	1	1	.2126	1.255	1.129	0.000	1.179	0.000
191	11	9	0	1	1	.2172	2.964	2.717	0.000	2.861	0.000
192	10	9	0	1	1	.1834	2.239	1.781	0.000	1.866	0.000
193	9	9	0	2	1	.1528	0.000	0.000	0.000	0.000	0.000
194	8	9	0	1	1	.1254	1.065	.632	1.049	.655	1.123
195	7	9	0	2	1	.1012	0.000	0.000	0.000	0.000	0.000
196	6	9	0	2	1	.0803	0.000	0.000	0.000	0.000	0.000
197	5	9	0	1	1	.0625	1.953	.733	1.089	.747	1.183
198	4	9	0	1	1	.0480	1.286	.421	.632	.427	.686
199	3	9	0	2	1	.0368	0.000	0.000	0.000	0.000	0.000
200	2	9	0	1	1	.0287	1.738	.461	.598	.462	.640
201	1	9	0	1	1	.0239	2.243	.561	.747	.557	.791
202	-1	9	0	1	1	.0239	2.948	.737	.982	.723	1.005
203	-2	9	0	1	1	.0287	1.328	.352	.457	.343	.457
204	-3	9	0	1	1	.0368	1.197	.349	.431	.337	.421
205	-4	9	0	1	1	.0480	1.286	.421	.632	.405	.600
206	-5	9	0	1	1	.0625	1.070	.401	.597	.383	.549
207	-6	9	0	1	1	.0803	2.195	.956	1.559	.905	1.384
208	-7	9	0	2	1	.1012	0.000	0.000	0.000	0.000	0.000
209	-8	9	0	2	1	.1254	0.000	0.000	0.000	0.000	0.000
210	-9	9	0	2	1	.1528	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
211	-10	9	0	1	1	.1834	2.538	2.020	0.000	1.853	0.000
212	-11	9	0	1	1	.2172	.894	.819	0.000	.746	0.000
213	-11	10	0	1	1	.2224	.901	.843	0.000	.761	0.000
214	-10	10	0	2	1	.1886	0.000	0.000	0.000	0.000	0.000
215	-9	10	0	1	1	.1580	1.806	1.276	.479	1.173	C.000
216	-8	10	0	1	1	.1306	1.078	.659	1.047	.611	.366
217	-7	1C	0	2	1	.1064	0.000	0.000	0.000	0.000	.840
218	-6	10	0	1	1	.0855	3.231	1.466	2.432	1.382	0.000
219	-5	10	0	1	1	.0678	2.604	1.023	1.732	.973	2.120
220	-4	10	0	1	1	.0533	2.577	.888	1.340	.851	1.567
221	-3	10	0	1	1	.0420	1.840	.567	.728	.547	1.253
222	-2	10	0	1	1	.0339	2.919	.824	1.036	.802	.702
223	-1	10	0	1	1	.0291	6.488	1.730	2.238	1.697	1.026
224	0	10	0	1	2	.0275	5.657	1.046	1.366	1.034	2.268
225	1	10	0	1	1	.0291	6.468	1.725	2.231	1.717	1.413
226	2	10	0	1	1	.0339	2.621	.740	.930	.742	2.347
227	3	10	0	1	1	.0420	1.359	.418	.538	.422	.992
228	4	10	0	1	1	.0533	2.956	1.019	1.537	1.035	.579
229	5	10	0	1	1	.0678	1.786	.702	1.188	.718	1.667
230	6	10	0	1	1	.0855	3.691	1.674	2.777	1.725	1.293
231	7	10	0	1	1	.1064	1.243	.655	1.001	.679	3.023
232	8	10	0	1	1	.1306	2.156	1.318	2.095	1.375	1.086
233	9	10	0	1	1	.1580	1.615	1.141	.428	1.198	2.258
234	10	10	0	2	1	.1886	0.000	0.000	0.000	0.000	.457
235	11	10	0	2	1	.2224	0.000	0.000	0.000	0.000	0.000
236	10	11	0	1	1	.1944	1.219	1.017	0.000	1.083	0.000
237	9	11	0	1	1	.1638	2.582	1.877	0.000	1.984	0.000
238	8	11	0	1	1	.1364	.772	.487	.787	.512	0.000
239	7	11	0	1	1	.1122	1.785	.977	1.555	1.019	.854
240	6	11	0	2	1	.0913	0.000	0.000	0.000	0.000	1.695
241	5	11	0	1	1	.0735	.646	.266	.460	.274	0.000
242	4	11	0	2	1	.0590	0.000	0.000	0.000	0.000	.501
243	3	11	0	1	1	.0478	1.722	.563	.839	.569	0.000
244	2	11	0	2	1	.0397	0.000	0.000	0.000	0.000	.902
245	1	11	0	1	1	.0349	1.056	.301	.377	.300	0.000
246	-1	11	0	2	1	.0349	0.000	0.000	0.000	0.000	.394
247	-2	11	0	1	1	.0397	1.093	.329	.399	.320	0.000
248	-3	11	0	1	1	.0478	2.367	.773	1.153	.746	.391
249	-4	11	0	1	1	.0590	.608	.221	.310	.211	1.097
250	-5	11	0	2	1	.0735	0.000	0.000	0.000	0.000	.285
251	-6	11	0	2	1	.0913	0.000	0.000	0.000	0.000	0.000
252	-7	11	0	1	1	.1122	2.914	1.595	2.539	1.485	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
253	-8	11	0	1	1	.1364	1.092	.689	1.113	.636	.872
254	-9	11	0	1	1	.1638	2.000	1.454	0.000	1.329	0.000
255	-10	11	0	2	1	.1944	0.000	0.000	0.000	0.000	0.000
256	-10	12	0	2	1	.2007	0.000	0.000	0.000	0.000	0.000
257	-9	12	0	2	1	.1701	0.000	0.000	0.000	0.000	0.000
258	-8	12	0	1	1	.1427	.783	.511	.872	.469	.667
259	-7	12	0	1	1	.1185	1.481	.843	1.450	.782	1.164
260	-6	12	0	1	1	.0976	2.213	1.097	1.692	1.027	1.418
261	-5	12	0	1	1	.0799	1.322	.574	.936	.542	.817
262	-4	12	0	1	1	.0654	1.654	.636	1.017	.607	.922
263	-3	12	0	1	1	.0541	2.721	.945	1.411	.910	1.322
264	-2	12	0	1	1	.0460	2.898	.930	1.331	.904	1.286
265	-1	12	0	1	1	.0412	1.656	.506	.635	.496	.631
266	0	12	0	1	2	.0396	2.784	.591	.719	.585	.731
267	1	12	0	1	1	.0412	2.405	.735	.923	.733	.959
268	2	12	0	1	1	.0460	2.898	.930	1.331	.937	1.405
269	3	12	0	1	1	.0541	3.252	1.129	1.686	1.146	1.806
270	4	12	0	1	1	.0654	2.254	.867	1.386	.888	1.500
271	5	12	0	2	1	.0799	0.000	0.000	0.000	0.000	0.000
272	6	12	0	1	1	.0976	2.618	1.298	2.001	1.351	2.190
273	7	12	0	1	1	.1185	2.565	1.461	2.512	1.532	2.751
274	8	12	0	2	1	.1427	0.000	0.000	0.000	0.000	0.000
275	9	12	0	1	1	.1701	.826	.619	0.000	.659	0.000
276	10	12	0	2	1	.2007	0.000	0.000	0.000	0.000	0.000
277	10	13	0	2	1	.2076	0.000	0.000	0.000	0.000	0.000
278	9	13	0	1	1	.1770	1.183	.915	0.000	.981	0.000
279	8	13	0	2	1	.1496	0.000	0.000	0.000	0.000	0.000
280	7	13	0	2	1	.1254	0.000	0.000	0.000	0.000	0.000
281	6	13	0	2	1	.1044	0.000	0.000	0.000	0.000	0.000
282	5	13	0	2	1	.0867	0.000	0.000	0.000	0.000	0.000
283	4	13	0	1	1	.0722	1.700	.694	1.212	.713	1.309
284	3	13	0	1	1	.0609	1.062	.393	.559	.400	.596
285	2	13	0	2	1	.0529	0.000	0.000	0.000	0.000	0.000
286	1	13	0	1	1	.0481	2.073	.679	1.020	.679	1.051
287	-1	13	0	2	1	.0481	0.000	0.000	0.000	0.000	0.000
288	-2	13	0	1	1	.0529	.590	.203	.307	.197	.293
289	-3	13	0	1	1	.0609	.867	.321	.456	.309	.421
290	-4	13	0	2	1	.0722	0.000	0.000	0.000	0.000	0.000
291	-5	13	0	1	1	.0867	1.353	.620	1.032	.584	.884
292	-6	13	0	1	1	.1044	2.256	1.174	1.783	1.094	1.464
293	-7	13	0	2	1	.1254	0.000	0.000	0.000	0.000	0.000
294	-8	13	0	2	1	.1496	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
295	-9	13	0	1	1	.1770	2.775	2.145	0.000	1.937	0.000
296	-10	13	0	1	1	.2076	1.761	1.553	0.000	1.387	0.000
297	-10	14	0	1	1	.2150	1.260	1.144	0.000	1.015	0.000
298	-9	14	0	1	1	.1844	1.895	1.514	0.000	1.360	0.000
299	-8	14	0	1	1	.1570	1.802	1.267	.716	1.151	.521
300	-7	14	0	2	1	.1328	0.000	0.000	0.000	0.000	0.000
301	-6	14	0	1	1	.1119	.728	.398	.630	.369	.506
302	-5	14	0	1	1	.0941	1.549	.749	1.203	.704	1.010
303	-4	14	0	1	1	.0796	1.981	.859	1.404	.816	1.229
304	-3	14	0	1	1	.0684	3.691	1.458	2.503	1.400	2.275
305	-2	14	0	2	1	.0603	0.000	0.000	0.000	0.000	0.000
306	-1	14	0	1	1	.0555	5.978	2.103	3.086	2.063	2.994
307	0	14	0	1	2	.0539	1.569	.384	.576	.381	.574
308	1	14	0	1	1	.0555	6.241	2.196	3.222	2.198	3.292
309	2	14	0	1	1	.0603	1.618	.595	.831	.602	.867
310	3	14	0	1	1	.0684	2.686	1.061	1.821	1.083	1.933
311	4	14	0	1	1	.0796	1.477	.640	1.046	.660	1.127
312	5	14	0	1	1	.0941	1.549	.749	1.203	.780	1.309
313	6	14	0	1	1	.1119	.728	.398	.630	.418	.691
314	7	14	0	1	1	.1328	1.532	.948	1.517	1.006	1.671
315	8	14	0	2	1	.1570	0.000	0.000	0.000	0.000	0.000
316	9	14	0	2	1	.1844	0.000	0.000	0.000	0.000	0.000
317	10	14	0	1	1	.2150	1.992	1.809	0.000	1.973	0.000
318	10	15	0	1	1	.2230	1.561	1.464	0.000	1.609	0.000
319	9	15	0	1	1	.1923	2.717	2.248	0.000	2.447	0.000
320	8	15	0	1	1	.1650	1.637	1.196	0.000	1.290	0.000
321	7	15	0	1	1	.1408	1.102	.713	1.178	.761	1.300
322	6	15	0	1	1	.1198	.743	.426	.745	.451	.817
323	5	15	0	2	1	.1021	0.000	0.000	0.000	0.000	0.000
324	4	15	0	1	1	.0876	1.175	.542	.905	.561	.971
325	3	15	0	2	1	.0763	0.000	0.000	0.000	0.000	0.000
326	2	15	0	2	1	.0683	0.000	0.000	0.000	0.000	0.000
327	1	15	0	1	1	.0634	5.546	2.098	3.194	2.104	3.233
328	-1	15	0	2	1	.0634	0.000	0.000	0.000	0.000	0.000
329	-2	15	0	2	1	.0683	0.000	0.000	0.000	0.000	0.000
330	-3	15	0	1	1	.0763	1.305	.551	.928	.528	.829
331	-4	15	0	2	1	.0876	0.000	0.000	0.000	0.000	0.000
332	-5	15	0	2	1	.1021	0.000	0.000	0.000	0.000	0.000
333	-6	15	0	2	1	.1198	0.000	0.000	0.000	0.000	0.000
334	-7	15	0	2	1	.1408	0.000	0.000	0.000	0.000	0.000
335	-8	15	0	1	1	.1650	2.588	1.892	0.000	1.709	0.000
336	-9	15	0	1	1	.1923	1.718	1.422	0.000	1.269	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
337	-10	15	0	2	1	.2230	0.000	0.000	0.000	0.000	0.000
338	-9	16	0	1	1	.2009	.871	.747	0.000	.663	0.000
339	-8	16	0	1	1	.1735	1.859	1.414	0.000	1.272	0.000
340	-7	16	0	1	1	.1493	1.587	1.073	2.020	.978	1.474
341	-6	16	0	1	1	.1284	.758	.458	.738	.422	.567
342	-5	16	0	1	1	.1106	1.920	1.040	1.622	.972	1.307
343	-4	16	0	1	1	.0961	1.393	.684	1.073	.647	.904
344	-3	16	0	1	1	.0849	1.647	.744	1.231	.712	1.081
345	-2	16	0	2	1	.0768	0.000	0.000	0.000	0.000	0.000
346	-1	16	0	1	1	.0720	1.284	.523	.915	.513	.865
347	0	16	0	1	2	.0704	1.276	.362	.644	.360	.627
348	1	16	0	1	1	.0720	.642	.261	.458	.263	.459
349	2	16	0	1	1	.0768	.654	.277	.465	.281	.477
350	3	16	0	1	1	.0849	2.230	1.007	1.667	1.035	1.749
351	4	16	0	2	1	.0961	0.000	0.000	0.000	0.000	0.000
352	5	16	0	1	1	.1106	1.026	.556	.867	.584	.940
353	6	16	0	2	1	.1284	0.000	0.000	0.000	0.000	0.000
354	7	16	0	2	1	.1493	0.000	0.000	0.000	0.000	0.000
355	8	16	0	1	1	.1735	.831	.632	0.000	.687	0.000
356	9	16	0	2	1	.2009	0.000	0.000	0.000	0.000	0.000
357	9	17	0	1	1	.2099	1.250	1.113	0.000	1.230	0.000
358	8	17	0	2	1	.1825	0.000	0.000	0.000	0.000	0.000
359	7	17	0	1	1	.1584	1.807	1.280	.389	1.383	.430
360	6	17	0	1	1	.1374	1.730	1.099	1.780	1.174	1.948
361	5	17	0	1	1	.1197	1.660	.953	1.661	1.006	1.794
362	4	17	0	1	1	.1052	.715	.374	.569	.390	.605
363	3	17	0	2	1	.0939	0.000	0.000	0.000	0.000	0.000
364	2	17	0	2	1	.0859	0.000	0.000	0.000	0.000	0.000
365	1	17	0	2	1	.0810	0.000	0.000	0.000	0.000	0.000
366	-1	17	0	2	1	.0810	0.000	0.000	0.000	0.000	0.000
367	-2	17	0	2	1	.0859	0.000	0.000	0.000	0.000	0.000
368	-3	17	0	1	1	.0939	2.076	1.003	1.614	.959	1.392
369	-4	17	0	1	1	.1052	1.430	.748	1.138	.706	.941
370	-5	17	0	2	1	.1197	0.000	0.000	0.000	0.000	0.000
371	-6	17	0	2	1	.1374	0.000	0.000	0.000	0.000	0.000
372	-7	17	0	1	1	.1584	9.664	6.843	2.080	6.206	1.480
373	-8	17	0	1	1	.1825	1.690	1.339	0.000	1.198	0.000
374	-9	17	0	2	1	.2099	0.000	0.000	0.000	0.000	0.000
375	-9	18	0	1	1	.2196	1.794	1.659	0.000	1.456	0.000
376	-8	18	0	1	1	.1922	2.104	1.739	0.000	1.548	0.000
377	-7	18	0	1	1	.1680	.823	.610	0.000	.551	0.000
378	-6	18	0	1	1	.1470	1.117	.747	1.360	.684	.996

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
379	-5	18	0	1	1	.1293	1.075	.652	1.042	.606	.804
380	-4	18	0	2	1	.1148	0.000	0.000	0.000	0.000	0.000
381	-3	18	0	1	1	.1035	2.361	1.220	1.848	1.166	1.565
382	-2	18	0	1	1	.0955	1.204	.588	.930	.570	.821
383	-1	18	0	1	1	.0907	2.740	1.292	2.159	1.268	1.980
384	0	18	0	1	2	.0890	2.810	.926	1.554	.921	1.475
385	1	18	0	1	1	.0907	3.140	1.481	2.473	1.492	2.424
386	2	18	0	1	1	.0955	.695	.340	.537	.347	.541
387	3	18	0	1	1	.1035	2.757	1.425	2.158	1.474	2.231
388	4	18	0	2	1	.1148	0.000	0.000	0.000	0.000	0.000
389	5	18	0	2	1	.1293	0.000	0.000	0.000	0.000	0.000
390	6	18	0	2	1	.1470	0.000	0.000	0.000	0.000	0.000
391	7	18	0	1	1	.1680	1.426	1.057	0.000	1.149	0.000
392	8	18	0	2	1	.1922	0.000	0.000	0.000	0.000	0.000
393	9	18	0	1	1	.2196	2.690	2.489	0.000	2.772	0.000
394	8	19	0	1	1	.2023	1.512	1.305	0.000	1.446	0.000
395	7	19	0	1	1	.1782	3.023	2.349	0.000	2.570	0.000
396	6	19	0	1	1	.1572	.806	.568	.296	.613	.323
397	5	19	0	2	1	.1395	0.000	0.000	0.000	0.000	0.000
398	4	19	0	1	1	.1250	1.303	.771	1.286	.811	1.350
399	3	19	0	1	1	.1137	1.935	1.070	1.735	1.110	1.778
400	2	19	0	2	1	.1057	0.000	0.000	0.000	0.000	0.000
401	1	19	0	2	1	.1008	0.000	0.000	0.000	0.000	0.000
402	-1	19	0	1	1	.1008	1.579	.801	1.203	.787	1.086
403	-2	19	0	1	1	.1057	1.894	.993	1.515	.961	1.313
404	-3	19	0	2	1	.1137	0.000	0.000	0.000	0.000	0.000
405	-4	19	0	1	1	.1250	1.504	.891	1.485	.837	1.176
406	-5	19	0	1	1	.1395	1.099	.706	1.150	.654	.866
407	-6	19	0	1	1	.1572	1.140	.803	.419	.733	.299
408	-7	19	0	1	1	.1782	3.247	2.524	0.000	2.270	0.000
409	-8	19	0	1	1	.2023	1.235	1.066	0.000	.944	0.000
410	-8	20	0	1	1	.2130	1.538	1.387	0.000	1.223	0.000
411	-7	20	0	1	1	.1889	3.624	2.953	0.000	2.646	0.000
412	-6	20	0	1	1	.1679	.823	.610	0.000	.555	0.000
413	-5	20	0	2	1	.1502	0.000	0.000	0.000	0.000	0.000
414	-4	20	0	1	1	.1357	1.090	.686	1.106	.644	.856
415	-3	20	0	2	1	.1244	0.000	0.000	0.000	0.000	0.000
416	-2	20	0	1	1	.1164	1.276	.717	1.202	.694	1.023
417	-1	20	0	1	1	.1115	1.924	1.049	1.655	1.030	1.469
418	0	20	0	1	2	.1099	2.611	.996	1.539	.993	1.420
419	1	20	0	1	1	.1115	1.626	.886	1.398	.897	1.337
420	2	20	0	1	1	.1164	.736	.414	.694	.425	.685

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
421	3	20	0	1	1	.1244	1.840	1.086	1.820	1.130	1.849
422	4	20	0	1	1	.1357	2.040	1.283	2.068	1.355	2.154
423	5	20	0	1	1	.1502	.795	.540	1.005	.578	1.070
424	6	20	0	1	1	.1679	1.164	.863	0.000	.937	0.000
425	7	20	0	1	1	.1889	4.438	3.617	0.000	3.982	0.000
426	8	20	0	2	1	.2130	0.000	0.000	0.000	0.000	0.000
427	8	21	0	1	1	.2243	1.806	1.702	0.000	1.913	0.000
428	7	21	0	1	1	.2001	1.231	1.052	0.000	1.166	0.000
429	6	21	0	1	1	.1792	2.057	1.606	0.000	1.754	0.000
430	5	21	0	2	1	.1615	0.000	0.000	0.000	0.000	0.000
431	4	21	0	1	1	.1470	1.368	.914	1.663	.969	1.718
432	3	21	0	1	1	.1357	1.724	1.084	1.748	1.132	1.757
433	2	21	0	2	1	.1276	0.000	0.000	0.000	0.000	0.000
434	1	21	0	2	1	.1228	0.000	0.000	0.000	0.000	0.000
435	-1	21	0	2	1	.1228	0.000	0.000	0.000	0.000	0.000
436	-2	21	0	2	1	.1276	0.000	0.000	0.000	0.000	0.000
437	-3	21	0	2	1	.1357	0.000	0.000	0.000	0.000	0.000
438	-4	21	0	2	1	.1470	0.000	0.000	0.000	0.000	0.000
439	-5	21	0	1	1	.1615	1.408	1.012	0.000	.933	0.000
440	-6	21	0	1	1	.1792	.840	.656	0.000	.595	0.000
441	-7	21	0	1	1	.2001	2.131	1.823	0.000	1.626	0.000
442	-8	21	0	1	1	.2243	2.856	2.692	0.000	2.362	0.000
443	-7	22	0	2	1	.2120	0.000	0.000	0.000	0.000	0.000
444	-6	22	0	1	1	.1910	2.268	1.866	0.000	1.687	0.000
445	-5	22	0	2	1	.1733	0.000	0.000	0.000	0.000	0.000
446	-4	22	0	1	1	.1588	1.981	1.406	.318	1.315	.235
447	-3	22	0	1	1	.1475	2.092	1.402	2.571	1.333	2.002
448	-2	22	0	1	1	.1395	1.346	.864	1.407	.836	1.151
449	-1	22	0	1	1	.1346	1.088	.680	1.093	.668	.936
450	0	22	0	2	2	.1330	0.000	0.000	0.000	0.000	0.000
451	1	22	0	1	1	.1346	1.332	.833	1.339	.846	1.244
452	2	22	0	1	1	.1395	1.346	.864	1.407	.892	1.355
453	3	22	0	2	1	.1475	0.000	0.000	0.000	0.000	0.000
454	4	22	0	1	1	.1588	1.618	1.148	.260	1.222	.266
455	5	22	0	2	1	.1733	0.000	0.000	0.000	0.000	0.000
456	6	22	0	1	1	.1910	2.100	1.727	0.000	1.897	0.000
457	7	22	0	2	1	.2120	0.000	0.000	0.000	0.000	0.000
458	7	23	0	1	1	.2243	.903	.851	0.000	.955	0.000
459	6	23	0	1	1	.2034	.875	.758	0.000	.837	0.000
460	5	23	0	2	1	.1857	0.000	0.000	0.000	0.000	0.000
461	4	23	0	2	1	.1712	0.000	0.000	0.000	0.000	0.000
462	3	23	0	2	1	.1599	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
463	2	23	0	2	1	.1518	0.000	0.000	0.000	0.000	0.000
464	1	23	0	2	1	.1470	0.000	0.000	0.000	0.000	0.000
465	-1	23	0	2	1	.1470	0.000	0.000	0.000	0.000	0.000
466	-2	23	0	1	1	.1518	1.128	.773	1.197	.747	.959
467	-3	23	0	2	1	.1599	0.000	0.000	0.000	0.000	0.000
468	-4	23	0	1	1	.1712	1.851	1.393	0.000	1.301	0.000
469	-5	23	0	2	1	.1857	0.000	0.000	0.000	0.000	0.000
470	-6	23	0	1	1	.2034	2.314	2.006	0.000	1.808	0.000
471	-7	23	0	1	1	.2243	2.020	1.903	0.000	1.685	0.000
472	-6	24	0	2	1	.2163	0.000	0.000	0.000	0.000	0.000
473	-5	24	0	1	1	.1986	1.227	1.043	0.000	.954	0.000
474	-4	24	0	1	1	.1841	1.198	.956	0.000	.891	0.000
475	-3	24	0	2	1	.1728	0.000	0.000	0.000	0.000	0.000
476	-2	24	0	2	1	.1647	0.000	0.000	0.000	0.000	0.000
477	-1	24	0	1	1	.1599	.811	.578	.011	.569	.009
478	0	24	0	1	2	.1583	1.807	.904	.289	.906	.249
479	1	24	0	2	1	.1599	0.000	0.000	0.000	0.000	0.000
480	2	24	0	1	1	.1647	1.829	1.336	0.000	1.386	0.000
481	3	24	0	1	1	.1728	2.349	1.781	0.000	1.880	0.000
482	4	24	0	2	1	.1841	0.000	0.000	0.000	0.000	0.000
483	5	24	0	2	1	.1986	0.000	0.000	0.000	0.000	0.000
484	6	24	0	2	1	.2163	0.000	0.000	0.000	0.000	0.000
485	5	25	0	1	1	.2120	.887	.796	0.000	.874	0.000
486	4	25	0	1	1	.1975	2.122	1.795	0.000	1.936	0.000
487	3	25	0	2	1	.1863	0.000	0.000	0.000	0.000	0.000
488	2	25	0	1	1	.1782	1.677	1.304	0.000	1.356	0.000
489	1	25	0	1	1	.1734	1.440	1.095	0.000	1.118	0.000
490	-1	25	0	1	1	.1734	2.199	1.672	0.000	1.647	0.000
491	-2	25	0	2	1	.1782	0.000	0.000	0.000	0.000	0.000
492	-3	25	0	1	1	.1863	.850	.685	0.000	.650	0.000
493	-4	25	0	1	1	.1975	.866	.733	0.000	.682	0.000
494	-5	25	0	1	1	.2120	1.254	1.126	0.000	1.028	0.000
495	-4	26	0	2	1	.2116	0.000	0.000	0.000	0.000	0.000
496	-3	26	0	2	1	.2003	0.000	0.000	0.000	0.000	0.000
497	-2	26	0	2	1	.1922	0.000	0.000	0.000	0.000	0.000
498	-1	26	0	1	1	.1874	2.087	1.690	0.000	1.665	0.000
499	0	26	0	1	2	.1858	3.290	1.871	0.000	1.879	0.000
500	1	26	0	1	1	.1874	1.476	1.195	0.000	1.223	0.000
501	2	26	0	2	1	.1922	0.000	0.000	0.000	0.000	0.000
502	3	26	0	2	1	.2003	0.000	0.000	0.000	0.000	0.000
503	4	26	0	2	1	.2116	0.000	0.000	0.000	0.000	0.000
504	3	27	0	1	1	.2148	1.991	1.808	0.000	1.929	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
505	2	27	0	1	1	.2068	1.523	1.339	0.000	1.401	0.000
506	1	27	0	2	1	.2019	0.000	0.000	0.000	0.000	0.000
507	-1	27	0	1	1	.2019	.873	.752	0.000	.742	0.000
508	-2	27	0	1	1	.2068	2.781	2.444	0.000	2.363	0.000
509	-3	27	0	1	1	.2148	1.781	1.617	0.000	1.532	0.000
510	-2	28	0	1	1	.2219	2.204	2.058	0.000	1.989	0.000
511	-1	28	0	2	1	.2171	0.000	0.000	0.000	0.000	0.000
512	0	28	0	1	2	.2155	1.260	.811	0.000	.817	0.000
513	1	28	0	1	1	.2171	1.787	1.637	0.000	1.684	0.000
514	2	28	0	2	1	.2219	0.000	0.000	0.000	0.000	0.000
515	0	28	1	1	1	.2225	2.207	2.065	0.000	2.181	0.000
516	-1	28	1	1	1	.2228	1.274	1.194	0.000	1.235	0.000
517	-3	27	1	1	1	.2179	2.000	1.838	0.000	1.820	0.000
518	-2	27	1	1	1	.2112	1.534	1.372	0.000	1.387	0.000
519	-1	27	1	1	1	.2077	.881	.777	0.000	.801	0.000
520	0	27	1	2	1	.2074	0.000	0.000	0.000	0.000	0.000
521	1	27	1	2	1	.2104	0.000	0.000	0.000	0.000	0.000
522	2	27	1	1	1	.2166	1.996	1.825	0.000	2.001	0.000
523	4	26	1	2	1	.2241	0.000	0.000	0.000	0.000	0.000
524	3	26	1	1	1	.2114	2.505	2.244	0.000	2.495	0.000
525	2	26	1	2	1	.2020	0.000	0.000	0.000	0.000	0.000
526	1	26	1	2	1	.1958	0.000	0.000	0.000	0.000	0.000
527	0	26	1	1	1	.1929	1.489	1.235	0.000	1.296	0.000
528	-1	26	1	1	1	.1931	1.216	1.010	0.000	1.039	0.000
529	-2	26	1	1	1	.1966	1.498	1.263	0.000	1.274	0.000
530	-3	26	1	1	1	.2033	.875	.758	0.000	.749	0.000
531	-4	26	1	1	1	.2132	1.539	1.388	0.000	1.345	0.000
532	-5	25	1	1	1	.2124	2.347	2.110	0.000	2.005	0.000
533	-4	25	1	1	1	.1992	1.229	1.047	0.000	1.014	0.000
534	-3	25	1	2	1	.1893	0.000	0.000	0.000	0.000	0.000
535	-2	25	1	1	1	.1826	2.070	1.641	0.000	1.652	0.000
536	-1	25	1	1	1	.1791	1.455	1.135	0.000	1.165	0.000
537	0	25	1	1	1	.1788	1.454	1.133	0.000	1.186	0.000
538	1	25	1	2	1	.1818	0.000	0.000	0.000	0.000	0.000
539	2	25	1	2	1	.1880	0.000	0.000	0.000	0.000	0.000
540	3	25	1	2	1	.1974	0.000	0.000	0.000	0.000	0.000
541	4	25	1	1	1	.2100	1.768	1.575	0.000	1.773	0.000
542	5	24	1	1	1	.2124	1.537	1.382	0.000	1.574	0.000
543	4	24	1	1	1	.1966	1.498	1.262	0.000	1.413	0.000
544	3	24	1	1	1	.1839	1.198	.955	0.000	1.051	0.000
545	2	24	1	1	1	.1745	1.666	1.274	0.000	1.376	0.000
546	1	24	1	1	1	.1683	1.427	1.060	0.000	1.125	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
547	0	24	1	2	1	.1654	0.000	0.000	0.000	0.000	0.000
548	-1	24	1	1	1	.1656	1.159	.850	0.000	.870	0.000
549	-2	24	1	2	1	.1691	0.000	0.000	0.000	0.000	0.000
550	-3	24	1	1	1	.1758	1.181	.908	0.000	.896	0.000
551	-4	24	1	2	1	.1858	0.000	0.000	0.000	0.000	0.000
552	-5	24	1	1	1	.1989	1.504	1.280	0.000	1.217	0.000
553	-6	24	1	1	1	.2153	1.543	1.404	0.000	1.310	0.000
554	-7	23	1	2	1	.2220	0.000	0.000	0.000	0.000	0.000
555	-6	23	1	1	1	.2024	3.493	3.015	0.000	2.816	0.000
556	-5	23	1	1	1	.1860	1.700	1.368	0.000	1.301	0.000
557	-4	23	1	1	1	.1728	1.661	1.260	0.000	1.220	0.000
558	-3	23	1	2	1	.1629	0.000	0.000	0.000	0.000	0.000
559	-2	23	1	1	1	.1562	1.609	1.127	.802	1.131	.754
560	-1	23	1	2	1	.1527	0.000	0.000	0.000	0.000	0.000
561	0	23	1	2	1	.1525	0.000	0.000	0.000	0.000	0.000
562	1	23	1	2	1	.1554	0.000	0.000	0.000	0.000	0.000
563	2	23	1	2	1	.1616	0.000	0.000	0.000	0.000	0.000
564	3	23	1	2	1	.1710	0.000	0.000	0.000	0.000	0.000
565	4	23	1	1	1	.1837	2.073	1.652	0.000	1.838	0.000
566	5	23	1	2	1	.1995	0.000	0.000	0.000	0.000	0.000
567	6	23	1	2	1	.2186	0.000	0.000	0.000	0.000	0.000
568	6	22	1	2	1	.2062	0.000	0.000	0.000	0.000	0.000
569	5	22	1	1	1	.1871	1.204	.974	0.000	1.095	0.000
570	4	22	1	1	1	.1713	2.028	1.528	0.000	1.690	0.000
571	3	22	1	2	1	.1587	0.000	0.000	0.000	0.000	0.000
572	2	22	1	1	1	.1492	2.632	1.779	3.346	1.906	3.563
573	1	22	1	1	1	.1431	1.567	1.025	1.758	1.080	1.831
574	0	22	1	2	1	.1401	0.000	0.000	0.000	0.000	0.000
575	-1	22	1	1	1	.1404	.779	.502	.824	.512	.812
576	-2	22	1	2	1	.1438	0.000	0.000	0.000	0.000	0.000
577	-3	22	1	1	1	.1505	.796	.542	.972	.534	.894
578	-4	22	1	1	1	.1605	1.814	1.298	0.000	1.257	0.000
579	-5	22	1	1	1	.1736	1.860	1.416	0.000	1.348	0.000
580	-6	22	1	2	1	.1900	0.000	0.000	0.000	0.000	0.000
581	-7	22	1	2	1	.2096	0.000	0.000	0.000	0.000	0.000
582	-8	21	1	1	1	.2206	1.270	1.180	0.000	1.069	0.000
583	-7	21	1	2	1	.1978	0.000	0.000	0.000	0.000	0.000
584	-6	21	1	1	1	.1782	3.933	3.057	0.000	2.863	0.000
585	-5	21	1	1	1	.1618	1.150	.828	0.000	.789	0.000
586	-4	21	1	2	1	.1487	0.000	0.000	0.000	0.000	0.000
587	-3	21	1	1	1	.1387	1.098	.702	1.141	.691	1.066
588	-2	21	1	1	1	.1320	1.873	1.154	1.842	1.155	1.780

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
589	-1	21	1	1	1	.1285	3.127	1.890	3.043	1.921	3.033
590	0	21	1	1	1	.1283	1.695	1.023	1.651	1.057	1.691
591	1	21	1	1	1	.1312	1.079	.662	1.055	.695	1.107
592	2	21	1	1	1	.1374	.774	.491	.796	.524	.853
593	3	21	1	2	1	.1468	0.000	0.000	0.000	0.000	0.000
594	4	21	1	2	1	.1595	0.000	0.000	0.000	0.000	0.000
595	5	21	1	2	1	.1753	0.000	0.000	0.000	0.000	0.000
596	6	21	1	1	1	.1944	1.928	1.609	0.000	1.823	0.000
597	7	21	1	2	1	.2167	0.000	0.000	0.000	0.000	0.000
598	7	20	1	1	1	.2054	1.241	1.085	0.000	1.238	0.000
599	6	20	1	1	1	.1831	2.238	1.778	0.000	2.001	0.000
600	5	20	1	1	1	.1641	1.415	1.030	0.000	1.142	0.000
601	4	20	1	2	1	.1482	0.000	0.000	0.000	0.000	0.000
602	3	20	1	1	1	.1356	1.888	1.187	1.912	1.278	2.091
603	2	20	1	2	1	.1262	0.000	0.000	0.000	0.000	0.000
604	1	20	1	1	1	.1200	.743	.427	.747	.447	.789
605	0	20	1	2	1	.1170	0.000	0.000	0.000	0.000	0.000
606	-1	20	1	2	1	.1173	0.000	0.000	0.000	0.000	0.000
607	-2	20	1	1	1	.1208	2.684	1.550	2.692	1.549	2.634
608	-3	20	1	2	1	.1275	0.000	0.000	0.000	0.000	0.000
609	-4	20	1	1	1	.1374	1.730	1.098	1.779	1.064	1.627
610	-5	20	1	1	1	.1505	1.779	1.211	2.174	1.154	1.912
611	-6	20	1	1	1	.1669	1.837	1.355	0.000	1.271	0.000
612	-7	20	1	1	1	.1865	1.203	.970	0.000	.896	0.000
613	-8	20	1	1	1	.2093	.883	.784	0.000	.712	0.000
614	-8	19	1	2	1	.1986	0.000	0.000	0.000	0.000	0.000
615	-7	19	1	1	1	.1758	1.670	1.284	0.000	1.188	0.000
616	-6	19	1	1	1	.1562	1.394	.976	.697	.917	.599
617	-5	19	1	1	1	.1398	3.112	2.002	3.263	1.910	2.920
618	-4	19	1	2	1	.1267	0.000	0.000	0.000	0.000	0.000
619	-3	19	1	2	1	.1167	0.000	0.000	0.000	0.000	0.000
620	-2	19	1	1	1	.1100	2.049	1.106	1.711	1.104	1.694
621	-1	19	1	1	1	.1066	1.899	1.002	1.532	1.014	1.558
622	0	19	1	1	1	.1063	1.604	.845	1.291	.868	1.344
623	1	19	1	1	1	.1093	1.446	.777	1.198	.809	1.273
624	2	19	1	2	1	.1154	0.000	0.000	0.000	0.000	0.000
625	4	19	1	2	1	.1375	0.000	0.000	0.000	0.000	0.000
626	3	19	1	2	1	.1249	0.000	0.000	0.000	0.000	0.000
627	5	19	1	2	1	.1533	0.000	0.000	0.000	0.000	0.000
628	6	19	1	1	1	.1724	2.195	1.662	0.000	1.856	0.000
629	7	19	1	1	1	.1947	1.725	1.442	0.000	1.632	0.000
630	8	19	1	2	1	.2202	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
631	8	18	1	2	1	.2101	0.000	0.000	0.000	0.000	0.000
632	7	18	1	2	1	.1845	0.000	0.000	0.000	0.000	0.000
633	6	18	1	1	1	.1622	1.628	1.175	0.000	1.303	0.000
634	5	18	1	2	1	.1432	0.000	0.000	0.000	0.000	0.000
635	4	18	1	1	1	.1273	1.853	1.112	1.812	1.201	2.006
636	3	18	1	2	1	.1147	0.000	0.000	0.000	0.000	0.000
637	2	18	1	2	1	.1053	0.000	0.000	0.000	0.000	0.000
638	1	18	1	1	1	.0991	.703	.352	.533	.366	.570
639	0	18	1	1	1	.0961	1.207	.592	.929	.607	.974
640	-1	18	1	2	1	.0964	0.000	0.000	0.000	0.000	0.000
641	-2	18	1	2	1	.0999	0.000	0.000	0.000	0.000	0.000
642	-3	18	1	2	1	.1066	0.000	0.000	0.000	0.000	0.000
643	-4	18	1	2	1	.1165	0.000	0.000	0.000	0.000	0.000
644	-5	18	1	2	1	.1297	0.000	0.000	0.000	0.000	0.000
645	-6	18	1	1	1	.1460	.788	.524	.941	.493	.823
646	-7	18	1	1	1	.1656	1.419	1.041	0.000	.965	0.000
647	-8	18	1	2	1	.1884	0.000	0.000	0.000	0.000	0.000
648	-9	18	1	1	1	.2145	1.541	1.398	0.000	1.258	0.000
649	-9	17	1	2	1	.2049	0.000	0.000	0.000	0.000	0.000
650	-8	17	1	1	1	.1788	2.518	1.963	0.000	1.800	0.000
651	-7	17	1	2	1	.1560	0.000	0.000	0.000	0.000	0.000
652	-6	17	1	2	1	.1364	0.000	0.000	0.000	0.000	0.000
653	-5	17	1	2	1	.1200	0.000	0.000	0.000	0.000	0.000
654	-4	17	1	2	1	.1069	0.000	0.000	0.000	0.000	0.000
655	-3	17	1	1	1	.0970	1.210	.597	.928	.587	.913
656	-2	17	1	2	1	.0903	0.000	0.000	0.000	0.000	0.000
657	-1	17	1	1	1	.0868	1.657	.759	1.265	.766	1.309
658	0	17	1	1	1	.0865	1.352	.618	1.029	.631	1.086
659	1	17	1	1	1	.0895	1.806	.844	1.418	.873	1.523
660	2	17	1	1	1	.0957	3.033	1.484	2.339	1.555	2.545
661	3	17	1	2	1	.1051	0.000	0.000	0.000	0.000	0.000
662	4	17	1	1	1	.1177	1.652	.936	1.595	1.006	1.763
663	5	17	1	1	1	.1336	1.085	.674	1.081	.734	1.199
664	6	17	1	1	1	.1526	1.787	1.229	1.713	1.353	1.900
665	7	17	1	1	1	.1749	2.358	1.806	0.000	2.012	0.000
666	8	17	1	1	1	.2004	1.508	1.291	0.000	1.456	0.000
667	9	16	1	1	1	.2201	1.555	1.441	0.000	1.629	0.000
668	8	16	1	1	1	.1914	2.101	1.731	0.000	1.935	0.000
669	7	16	1	1	1	.1659	1.159	.851	0.000	.941	0.000
670	6	16	1	1	1	.1436	1.358	.891	1.540	.974	1.699
671	5	16	1	2	1	.1245	0.000	0.000	0.000	0.000	0.000
672	4	16	1	1	1	.1086	1.443	.772	1.188	.825	1.312

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
673	3	16	1	2	1	.0960	0.000	0.000	0.000	0.000	0.000
674	2	16	1	1	1	.0866	1.656	.758	1.262	.791	1.375
675	1	16	1	1	1	.0804	1.622	.707	1.154	.729	1.244
676	0	16	1	1	1	.0774	.927	.395	.658	.402	.699
677	-1	16	1	1	1	.0777	3.652	1.559	2.593	1.569	2.704
678	-2	16	1	1	1	.0812	1.757	.771	1.261	.766	1.287
679	-3	16	1	1	1	.0879	1.176	.543	.908	.533	.904
680	-4	16	1	1	1	.0978	1.566	.778	1.196	.754	1.157
681	-5	16	1	2	1	.1110	0.000	0.000	0.000	0.000	0.000
682	-6	16	1	2	1	.1273	0.000	0.000	0.000	0.000	0.000
683	-7	16	1	1	1	.1469	1.368	.914	1.662	.852	1.449
684	-8	16	1	1	1	.1698	1.651	1.235	0.000	1.136	0.000
685	-9	16	1	1	1	.1958	.864	.725	0.000	.658	0.000
686	-10	15	1	1	1	.2165	1.785	1.632	0.000	1.468	0.000
687	-9	15	1	1	1	.1873	1.704	1.379	0.000	1.256	0.000
688	-8	15	1	1	1	.1612	1.990	1.429	0.000	1.319	0.000
689	-7	15	1	1	1	.1384	1.097	.700	1.137	.654	1.009
690	-6	15	1	1	1	.1188	.741	.423	.730	.400	.672
691	-5	15	1	1	1	.1024	1.587	.814	1.229	.780	1.169
692	-4	15	1	1	1	.0893	1.364	.637	1.070	.617	1.048
693	-3	15	1	2	1	.0794	0.000	0.000	0.000	0.000	0.000
694	-2	15	1	1	1	.0727	2.654	1.087	1.892	1.079	1.947
695	-1	15	1	1	1	.0692	4.116	1.637	2.863	1.644	3.005
696	0	15	1	1	1	.0689	1.794	.712	1.238	.724	1.321
697	1	15	1	1	1	.0719	2.723	1.108	1.941	1.139	2.098
698	2	15	1	1	1	.0781	1.314	.562	.932	.584	1.017
699	3	15	1	1	1	.0875	.678	.312	.521	.328	.573
700	4	15	1	1	1	.1001	1.727	.872	1.305	.926	1.438
701	5	15	1	1	1	.1160	1.645	.922	1.538	.990	1.693
702	6	15	1	2	1	.1350	0.000	0.000	0.000	0.000	0.000
703	7	15	1	2	1	.1573	0.000	0.000	0.000	0.000	0.000
704	8	15	1	1	1	.1829	.845	.671	0.000	.744	0.000
705	9	15	1	1	1	.2116	1.981	1.776	0.000	1.989	0.000
706	9	14	1	2	1	.2036	0.000	0.000	0.000	0.000	0.000
707	8	14	1	1	1	.1749	1.864	1.427	0.000	1.568	0.000
708	7	14	1	2	1	.1494	0.000	0.000	0.000	0.000	0.000
709	6	14	1	1	1	.1271	1.069	.640	1.047	.690	1.140
710	5	14	1	1	1	.1080	1.765	.940	1.444	1.003	1.581
711	4	14	1	2	1	.0921	0.000	0.000	0.000	0.000	0.000
712	3	14	1	1	1	.0795	.934	.404	.662	.423	.725
713	2	14	1	1	1	.0701	1.686	.676	1.203	.700	1.313
714	1	14	1	2	1	.0639	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
715	0	14	1	1	1	.0610	2.376	.879	1.250	.891	1.339
716	-1	14	1	1	1	.0612	2.677	.993	1.422	.995	1.502
717	-2	14	1	1	1	.0647	.882	.337	.530	.334	.550
718	-3	14	1	2	1	.0714	0.000	0.000	0.000	0.000	0.000
719	-4	14	1	2	1	.0813	0.000	0.000	0.000	0.000	0.000
720	-5	14	1	2	1	.0945	0.000	0.000	0.000	0.000	0.000
721	-6	14	1	2	1	.1109	0.000	0.000	0.000	0.000	0.000
722	-7	14	1	1	1	.1304	2.016	1.231	1.956	1.153	1.766
723	-8	14	1	1	1	.1533	.800	.552	.702	.511	.610
724	-9	14	1	1	1	.1793	2.058	1.608	0.000	1.471	0.000
725	-10	14	1	2	1	.2086	0.000	0.000	0.000	0.000	0.000
726	-10	13	1	2	1	.2011	0.000	0.000	0.000	0.000	0.000
727	-9	13	1	1	1	.1719	1.172	.885	0.000	.813	0.000
728	-8	13	1	2	1	.1458	0.000	0.000	0.000	0.000	0.000
729	-7	13	1	1	1	.1230	1.834	1.073	1.824	1.008	1.674
730	-6	13	1	1	1	.1034	1.232	.637	.964	.605	.914
731	-5	13	1	1	1	.0871	.958	.440	.733	.422	.716
732	-4	13	1	1	1	.0739	.647	.268	.461	.260	.462
733	-3	13	1	1	1	.0640	1.644	.625	.965	.613	.989
734	-2	13	1	1	1	.0573	1.809	.647	.928	.641	.969
735	-1	13	1	1	1	.0538	6.575	2.277	3.413	2.279	3.622
736	0	13	1	1	1	.0535	1.776	.614	.923	.620	.992
737	1	13	1	2	1	.0565	0.000	0.000	0.000	0.000	0.000
738	2	13	1	1	1	.0627	3.212	1.207	1.800	1.244	1.964
739	3	13	1	1	1	.0721	.642	.262	.458	.273	.501
740	4	13	1	2	1	.0847	0.000	0.000	0.000	0.000	0.000
741	5	13	1	2	1	.1006	0.000	0.000	0.000	0.000	0.000
742	6	13	1	1	1	.1196	1.819	1.043	1.817	1.117	1.963
743	7	13	1	2	1	.1419	0.000	0.000	0.000	0.000	0.000
744	8	13	1	2	1	.1675	0.000	0.000	0.000	0.000	0.000
745	9	13	1	2	1	.1962	0.000	0.000	0.000	0.000	0.000
746	10	12	1	1	1	.2213	.899	.838	0.000	.920	0.000
747	9	12	1	1	1	.1893	2.094	1.710	0.000	1.863	0.000
748	8	12	1	2	1	.1606	0.000	0.000	0.000	0.000	0.000
749	7	12	1	2	1	.1351	0.000	0.000	0.000	0.000	0.000
750	6	12	1	1	1	.1128	1.032	.567	.909	.603	.974
751	5	12	1	1	1	.0937	1.383	.667	1.076	.703	1.164
752	4	12	1	1	1	.0779	1.608	.687	1.141	.718	1.242
753	3	12	1	2	1	.0652	0.000	0.000	0.000	0.000	0.000
754	2	12	1	1	1	.0558	1.467	.518	.756	.532	.824
755	1	12	1	1	1	.0496	1.924	.640	.997	.651	1.082
756	0	12	1	1	1	.0467	1.892	.611	.888	.616	.957

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
757	-1	12	1	1	1	.0469	2.424	.785	1.148	.784	1.224
758	-2	12	1	1	1	.0504	1.932	.648	1.012	.641	1.064
759	-3	12	1	2	1	.0571	0.000	0.000	0.000	0.000	0.000
760	-4	12	1	1	1	.0670	1.666	.650	1.083	.631	1.096
761	-5	12	1	1	1	.0802	1.146	.499	.813	.480	.804
762	-6	12	1	1	1	.0966	1.560	.768	1.198	.731	1.152
763	-7	12	1	1	1	.1162	2.082	1.168	1.954	1.100	1.821
764	-8	12	1	1	1	.1390	1.098	.703	1.144	.655	1.030
765	-9	12	1	2	1	.1650	0.000	0.000	0.000	0.000	0.000
766	-10	12	1	1	1	.1943	1.493	1.245	0.000	1.136	0.000
767	-11	11	1	2	1	.2204	0.000	0.000	0.000	0.000	0.000
768	-10	11	1	2	1	.1880	0.000	0.000	0.000	0.000	0.000
769	-9	11	1	1	1	.1587	2.557	1.814	.442	1.680	.391
770	-8	11	1	1	1	.1327	3.063	1.894	3.028	1.772	2.774
771	-7	11	1	1	1	.1098	1.916	1.033	1.596	.975	1.510
772	-6	11	1	1	1	.0902	3.421	1.608	2.699	1.533	2.629
773	-5	11	1	1	1	.0739	3.422	1.416	2.437	1.362	2.435
774	-4	11	1	1	1	.0607	5.877	2.170	3.065	2.107	3.131
775	-3	11	1	1	1	.0508	3.598	1.211	1.883	1.186	1.960
776	-2	11	1	1	1	.0441	5.120	1.611	2.194	1.593	2.319
777	-1	11	1	1	1	.0406	5.740	1.742	2.153	1.738	2.304
778	0	11	1	2	1	.0403	0.000	0.000	0.000	0.000	0.000
779	1	11	1	1	1	.0433	3.955	1.235	1.646	1.253	1.787
780	2	11	1	1	1	.0495	2.319	.770	1.196	.788	1.302
781	3	11	1	1	1	.0589	.859	.312	.438	.322	.476
782	4	11	1	2	1	.0715	0.000	0.000	0.000	0.000	0.000
783	5	11	1	1	1	.0874	1.174	.540	.902	.566	.968
784	6	11	1	2	1	.1065	0.000	0.000	0.000	0.000	0.000
785	7	11	1	2	1	.1288	0.000	0.000	0.000	0.000	0.000
786	8	11	1	2	1	.1543	0.000	0.000	0.000	0.000	0.000
787	9	11	1	2	1	.1830	0.000	0.000	0.000	0.000	0.000
788	10	11	1	2	1	.2150	0.000	0.000	0.000	0.000	0.000
789	10	10	1	2	1	.2092	0.000	0.000	0.000	0.000	0.000
790	9	10	1	1	1	.1772	2.511	1.944	0.000	2.080	0.000
791	8	10	1	2	1	.1485	0.000	0.000	0.000	0.000	0.000
792	7	10	1	2	1	.1230	0.000	0.000	0.000	0.000	0.000
793	6	10	1	1	1	.1007	1.412	.716	1.074	.751	1.129
794	5	10	1	1	1	.0816	1.330	.586	.959	.610	1.021
795	4	10	1	1	1	.0658	1.400	.541	.873	.559	.938
796	3	10	1	1	1	.0531	1.563	.538	.813	.552	.880
797	2	10	1	1	1	.0437	1.373	.431	.581	.439	.630
798	1	10	1	2	1	.0375	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
799	0	10	1	2	1	.0346	0.000	0.000	0.000	0.000	0.000
800	-1	10	1	1	1	.0348	1.293	.369	.461	.367	.495
801	-2	10	1	1	1	.0383	2.360	.699	.857	.690	.910
802	-3	10	1	1	1	.0450	1.874	.596	.831	.584	.870
803	-4	10	1	1	1	.0549	1.886	.660	.975	.641	1.004
804	-5	10	1	2	1	.0681	0.000	0.000	0.000	0.000	0.000
805	-6	10	1	2	1	.0845	0.000	0.000	0.000	0.000	0.000
806	-7	10	1	2	1	.1041	0.000	0.000	0.000	0.000	0.000
807	-8	10	1	2	1	.1269	0.000	0.000	0.000	0.000	0.000
808	-9	10	1	1	1	.1529	1.385	.954	1.275	.887	1.147
809	-10	10	1	1	1	.1822	2.670	2.113	0.000	1.948	0.000
810	-11	10	1	2	1	.2147	0.000	0.000	0.000	0.000	0.000
811	-11	9	1	2	1	.2095	0.000	0.000	0.000	0.000	0.000
812	-10	9	1	2	1	.1770	0.000	0.000	0.000	0.000	0.000
813	-9	9	1	1	1	.1477	2.237	1.501	2.760	1.402	2.526
814	-8	9	1	1	1	.1217	1.055	.613	1.055	.577	.997
815	-7	9	1	1	1	.0988	2.433	1.217	1.848	1.156	1.797
816	-6	9	1	1	1	.0792	4.119	1.780	2.920	1.704	2.911
817	-5	9	1	2	1	.0629	0.000	0.000	0.000	0.000	0.000
818	-4	9	1	1	1	.0497	3.850	1.282	2.001	1.247	2.078
819	-3	9	1	1	1	.0398	1.547	.466	.566	.456	.596
820	-2	9	1	1	1	.0331	.521	.146	.184	.144	.196
821	-1	9	1	1	1	.0296	1.518	.407	.525	.405	.565
822	0	9	1	1	1	.0294	2.473	.662	.854	.662	.924
823	1	9	1	2	1	.0323	0.000	0.000	0.000	0.000	0.000
824	2	9	1	1	1	.0385	.542	.161	.197	.163	.213
825	3	9	1	1	1	.0479	1.990	.651	.975	.665	1.049
826	4	9	1	1	1	.0605	1.369	.505	.709	.519	.757
827	5	9	1	1	1	.0764	1.599	.675	1.137	.699	1.199
828	6	9	1	1	1	.0955	1.391	.679	1.074	.708	1.116
829	7	9	1	1	1	.1178	1.280	.726	1.237	.761	1.263
830	8	9	1	1	1	.1433	1.567	1.027	1.767	1.083	1.766
831	9	9	1	1	1	.1720	2.031	1.535	0.000	1.628	0.000
832	10	9	1	2	1	.2040	0.000	0.000	0.000	0.000	0.000
833	10	8	1	1	1	.1993	1.229	1.047	0.000	1.106	0.000
834	9	8	1	1	1	.1674	1.163	.860	0.000	.904	0.000
835	8	8	1	2	1	.1386	0.000	0.000	0.000	0.000	0.000
836	7	8	1	1	1	.1131	1.033	.569	.915	.592	.922
837	6	8	1	1	1	.0908	1.371	.647	1.079	.670	1.109
838	5	8	1	1	1	.0717	1.924	.782	1.372	.805	1.434
839	4	8	1	1	1	.0559	3.112	1.099	1.604	1.125	1.699
840	3	8	1	2	1	.0432	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
841	2	8	1	1	1	.0338	2.223	.626	.788	.634	.849
842	1	8	1	1	1	.0276	3.370	.883	1.152	.888	1.245
843	0	8	1	2	1	.0247	C.000	0.000	0.000	0.000	0.000
844	-1	8	1	1	1	.0249	.684	.173	.230	.172	.247
845	-2	8	1	1	1	.0284	1.324	.350	.455	.345	.487
846	-3	8	1	1	1	.0351	.748	.214	.267	.210	.283
847	-4	8	1	2	1	.0451	0.000	0.000	0.000	0.000	0.000
848	-5	8	1	1	1	.0582	2.266	.818	1.158	.790	1.191
849	-6	8	1	1	1	.0746	.648	.270	.462	.259	.465
850	-7	8	1	2	1	.0942	0.000	0.000	0.000	0.000	0.000
851	-8	8	1	2	1	.1170	0.000	0.000	0.000	0.000	0.000
852	-9	8	1	2	1	.1430	0.000	0.000	0.000	0.000	0.000
853	-10	8	1	1	1	.1723	.830	.628	0.000	.584	0.000
854	-11	8	1	2	1	.2048	0.000	0.000	0.000	0.000	0.000
855	-11	7	1	2	1	.2007	0.000	0.000	0.000	0.000	0.000
856	-10	7	1	1	1	.1682	1.164	.864	0.000	.809	0.000
857	-9	7	1	2	1	.1389	0.000	0.000	0.000	0.000	0.000
858	-8	7	1	1	1	.1129	2.528	1.390	2.231	1.319	2.168
859	-7	7	1	1	1	.0901	2.901	1.362	2.291	1.301	2.282
860	-6	7	1	1	1	.0705	1.277	.513	.910	.493	.927
861	-5	7	1	1	1	.0541	9.425	3.273	4.887	3.167	5.065
862	-4	7	1	1	1	.0409	3.165	.964	1.203	.939	1.265
863	-3	7	1	1	1	.0310	3.198	.872	1.116	.855	1.187
864	-2	7	1	1	1	.0243	2.883	.724	.964	.714	1.034
865	-1	7	1	1	1	.0208	9.998	2.402	3.260	2.381	3.513
866	0	7	1	1	1	.0206	9.976	2.389	3.247	2.381	3.504
867	1	7	1	1	1	.0235	2.859	.711	.950	.713	1.024
868	2	7	1	1	1	.0297	3.121	.839	1.081	.845	1.158
869	3	7	1	2	1	.0391	0.000	0.000	0.000	0.000	0.000
870	4	7	1	1	1	.0517	1.437	.488	.750	.497	.788
871	5	7	1	1	1	.0676	.631	.248	.418	.253	.432
872	6	7	1	1	1	.0867	2.789	1.277	2.126	1.312	2.158
873	7	7	1	2	1	.1090	0.000	0.000	0.000	0.000	0.000
874	8	7	1	2	1	.1345	0.000	0.000	0.000	0.000	0.000
875	9	7	1	2	1	.1632	0.000	0.000	0.000	0.000	0.000
876	10	7	1	2	1	.1952	0.000	0.000	0.000	0.000	0.000
877	10	6	1	2	1	.1916	0.000	0.000	0.000	0.000	0.000
878	9	6	1	2	1	.1597	0.000	0.000	0.000	0.000	0.000
879	8	6	1	1	1	.1309	1.705	1.044	1.662	1.075	1.582
880	7	6	1	1	1	.1054	1.012	.530	.807	.543	.790
881	6	6	1	1	1	.0831	4.383	1.952	3.213	1.994	3.220
882	5	6	1	1	1	.0640	1.758	.669	1.033	.680	1.057

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
883	4	6	1	1	1	.0482	1.287	.422	.636	.427	.661
884	3	6	1	1	1	.0355	1.187	.341	.425	.344	.448
885	2	6	1	1	1	.0261	.979	.252	.331	.253	.353
886	1	6	1	1	1	.0199	1.708	.406	.554	.406	.594
887	0	6	1	2	1	.0170	0.000	0.000	0.000	0.000	0.000
888	-1	6	1	1	1	.0172	1.319	.303	.419	.300	.452
889	-2	6	1	2	1	.0207	0.000	0.000	0.000	0.000	0.000
890	-3	6	1	1	1	.0274	1.215	.317	.415	.311	.443
891	-4	6	1	1	1	.0374	.538	.158	.194	.154	.206
892	-5	6	1	1	1	.0505	2.019	.678	1.057	.657	1.104
893	-6	6	1	1	1	.0669	.890	.347	.576	.334	.591
894	-7	6	1	1	1	.0865	2.242	1.025	1.706	.982	1.718
895	-8	6	1	2	1	.1093	0.000	0.000	0.000	0.000	0.000
896	-9	6	1	2	1	.1353	0.000	0.000	0.000	0.000	0.000
897	-10	6	1	2	1	.1646	0.000	0.000	0.000	0.000	0.000
898	-11	6	1	1	1	.1971	1.732	1.462	0.000	1.367	0.000
899	-11	5	1	2	1	.1941	0.000	0.000	0.000	0.000	0.000
900	-10	5	1	1	1	.1616	1.626	1.170	0.000	1.106	0.000
901	-9	5	1	1	1	.1323	1.874	1.157	1.848	1.100	1.796
902	-8	5	1	1	1	.1063	2.151	1.133	1.731	1.083	1.724
903	-7	5	1	1	1	.0835	1.771	.791	1.303	.760	1.326
904	-6	5	1	1	1	.0639	5.694	2.162	3.327	2.088	3.446
905	-5	5	1	1	1	.0475	2.689	.876	1.298	.850	1.364
906	-4	5	1	1	1	.0343	4.763	1.350	1.694	1.317	1.800
907	-3	5	1	1	1	.0244	3.996	1.006	1.337	.985	1.431
908	-2	5	1	1	1	.0177	10.792	2.490	3.442	2.451	3.702
909	-1	5	1	2	1	.0142	0.000	0.000	0.000	0.000	0.000
910	0	5	1	1	1	.0140	5.667	1.244	1.757	1.235	1.888
911	1	5	1	1	1	.0169	3.964	.905	1.257	.902	1.343
912	2	5	1	1	1	.0231	4.671	1.156	1.548	1.156	1.639
913	3	5	1	1	1	.0325	1.159	.322	.408	.323	.427
914	4	5	1	1	1	.0451	1.496	.476	.666	.480	.686
915	5	5	1	2	1	.0610	0.000	0.000	0.000	0.000	0.000
916	6	5	1	1	1	.0801	1.985	.863	1.407	.876	1.390
917	7	5	1	2	1	.1024	0.000	0.000	0.000	0.000	0.000
918	8	5	1	1	1	.1279	1.855	1.117	1.810	1.140	1.693
919	9	5	1	1	1	.1566	.805	.565	.356	.579	.323
920	10	5	1	1	1	.1886	1.207	.983	0.000	1.009	0.000
921	11	5	1	2	1	.2238	0.000	0.000	0.000	0.000	0.000
922	11	4	1	1	1	.2213	.899	.838	0.000	.853	0.000
923	10	4	1	2	1	.1861	0.000	0.000	0.000	0.000	0.000
924	9	4	1	1	1	.1542	1.388	.962	1.058	.977	.939

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
925	8	4	1	1	1	.1254	1.992	1.182	1.963	1.198	1.803
926	7	4	1	2	1	.0959	0.000	0.000	0.000	0.000	0.000
927	6	4	1	1	1	.0776	.927	.395	.658	.399	.641
928	5	4	1	1	1	.0585	1.820	.659	.929	.662	.927
929	4	4	1	1	1	.0427	6.229	1.932	2.532	1.938	2.579
930	3	4	1	1	1	.0300	2.382	.643	.826	.643	.856
931	2	4	1	2	1	.0206	0.000	0.000	0.000	0.000	0.000
932	1	4	1	1	1	.0145	4.624	1.022	1.439	1.015	1.529
933	0	4	1	2	1	.0115	0.000	0.000	0.000	0.000	0.000
934	-1	4	1	1	1	.0117	1.055	.225	.321	.222	.346
935	-2	4	1	1	1	.0152	2.626	.586	.822	.577	.885
936	-3	4	1	1	1	.0219	1.480	.361	.486	.353	.522
937	-4	4	1	1	1	.0319	1.930	.532	.677	.519	.722
938	-5	4	1	2	1	.0450	0.000	0.000	0.000	0.000	0.000
939	-6	4	1	1	1	.0614	3.134	1.164	1.675	1.127	1.748
940	-7	4	1	1	1	.0810	.938	.411	.672	.396	.690
941	-8	4	1	1	1	.1038	2.137	1.107	1.677	1.062	1.690
942	-9	4	1	2	1	.1298	0.000	0.000	0.000	0.000	0.000
943	-10	4	1	1	1	.1591	2.141	1.522	.255	1.447	.244
944	-11	4	1	1	1	.1916	.858	.708	0.000	.670	0.000
945	-11	3	1	1	1	.1897	1.209	.989	0.000	.942	0.000
946	-10	3	1	1	1	.1572	2.280	1.605	.848	1.535	.825
947	-9	3	1	1	1	.1279	2.624	1.580	2.560	1.516	2.553
948	-8	3	1	1	1	.1019	.708	.362	.545	.349	.555
949	-7	3	1	1	1	.0791	1.142	.493	.809	.476	.839
950	-6	3	1	1	1	.0595	3.106	1.134	1.580	1.101	1.660
951	-5	3	1	2	1	.0431	0.000	0.000	0.000	0.000	0.000
952	-4	3	1	1	1	.0299	6.692	1.803	2.320	1.762	2.483
953	-3	3	1	1	1	.0200	2.962	.704	.960	.690	1.032
954	-2	3	1	1	1	.0133	8.044	1.750	2.482	1.721	2.668
955	-1	3	1	1	1	.0098	8.672	1.798	2.601	1.773	2.789
956	0	3	1	1	1	.0096	.378	.078	.113	.077	.121
957	1	3	1	1	1	.0125	12.649	2.723	3.879	2.699	4.096
958	2	3	1	1	1	.0187	2.657	.621	.854	.617	.890
959	3	3	1	1	1	.0281	4.547	1.199	1.559	1.194	1.600
960	4	3	1	1	1	.0408	1.101	.335	.415	.334	.418
961	5	3	1	1	1	.0566	2.249	.800	1.156	.800	1.138
962	6	3	1	1	1	.0757	2.160	.907	1.536	.908	1.473
963	7	3	1	1	1	.0980	1.213	.603	.926	.606	.862
964	8	3	1	1	1	.1235	2.120	1.244	2.105	1.250	1.897
965	9	3	1	2	1	.1522	0.000	0.000	0.000	0.000	0.000
966	10	3	1	2	1	.1842	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
967	11	3	1	1	1	.2194	1.268	1.172	0.000	1.183	0.000
968	11	2	1	2	1	.2180	0.000	0.000	0.000	0.000	0.000
969	10	2	1	2	1	.1828	0.000	0.000	0.000	0.000	0.000
970	9	2	1	1	1	.1509	1.126	.768	1.330	.766	1.131
971	8	2	1	2	1	.1221	0.000	0.000	0.000	0.000	0.000
972	7	2	1	1	1	.0966	2.516	1.239	1.932	1.235	1.767
973	6	2	1	1	1	.0743	3.239	1.345	2.306	1.339	2.176
974	5	2	1	1	1	.0552	1.791	.629	.925	.625	.898
975	4	2	1	1	1	.0394	.545	.163	.199	.162	.198
976	3	2	1	1	1	.0267	1.776	.460	.604	.457	.613
977	2	2	1	1	1	.0173	7.005	1.609	2.228	1.593	2.303
978	1	2	1	2	1	.0112	0.000	0.000	0.000	0.000	0.000
979	0	2	1	1	1	.0082	1.092	.221	.323	.218	.343
980	-1	2	1	1	1	.0085	.820	.167	.243	.164	.260
981	-2	2	1	1	1	.0119	1.328	.283	.405	.279	.435
982	-3	2	1	1	1	.0186	1.099	.257	.353	.252	.379
983	-4	2	1	2	1	.0286	0.000	0.000	0.000	0.000	0.000
984	-5	2	1	1	1	.0417	1.238	.380	.485	.371	.518
985	-6	2	1	1	1	.0581	1.483	.534	.758	.520	.802
986	-7	2	1	2	1	.0777	0.000	0.000	0.000	0.000	0.000
987	-8	2	1	1	1	.1005	.706	.357	.536	.346	.551
988	-9	2	1	2	1	.1265	0.000	0.000	0.000	0.000	0.000
989	-10	2	1	1	1	.1558	2.127	1.487	1.172	1.430	1.156
990	-11	2	1	2	1	.1883	0.000	0.000	0.000	0.000	0.000
991	-12	2	1	1	1	.2240	3.255	3.064	0.000	2.925	0.000
992	-12	1	1	2	1	.2232	0.000	0.000	0.000	0.000	0.000
993	-11	1	1	1	1	.1875	.852	.690	0.000	.665	0.000
994	-10	1	1	1	1	.1550	2.124	1.479	1.396	1.429	1.395
995	-9	1	1	1	1	.1257	2.717	1.615	2.674	1.565	2.728
996	-8	1	1	1	1	.0997	1.408	.709	1.065	.688	1.105
997	-7	1	1	1	1	.0769	2.265	.960	1.610	.935	1.693
998	-6	1	1	1	1	.0573	1.348	.482	.692	.471	.735
999	-5	1	1	1	1	.0409	4.802	1.462	1.822	1.429	1.950
1000	-4	1	1	1	1	.0277	3.722	.976	1.273	.956	1.368
1001	-3	1	1	1	1	.0178	5.782	1.336	1.846	1.311	1.983
1002	-2	1	1	1	1	.0111	2.915	.615	.884	.605	.947
1003	-1	1	1	1	1	.0076	.945	.190	.278	.187	.296
1004	0	1	1	1	1	.0074	2.811	.563	.826	.554	.871
1005	1	1	1	1	1	.0103	11.382	2.376	3.428	2.343	3.569
1006	2	1	1	1	1	.0165	14.948	3.395	4.725	3.351	4.839
1007	3	1	1	1	1	.0259	4.371	1.121	1.477	1.107	1.483
1008	4	1	1	2	1	.0386	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1009	5	1	1	1	1	.0544	1.030	.359	.534	.355	.510
1010	6	1	1	2	1	.0735	0.000	0.000	0.000	0.000	0.000
1011	7	1	1	1	1	.0958	.984	.482	.759	.477	.681
1012	8	1	1	1	1	.1213	1.054	.611	1.055	.604	.913
1013	9	1	1	2	1	.1500	0.000	0.000	0.000	0.000	0.000
1014	10	1	1	2	1	.1820	0.000	0.000	0.000	0.000	0.000
1015	11	1	1	1	1	.2172	.894	.819	0.000	.810	0.000
1016	11	0	1	2	2	.2169	0.000	0.000	0.000	0.000	0.000
1017	9	0	1	1	2	.1498	.794	.381	.721	.374	.586
1018	7	0	1	1	2	.0955	3.613	1.249	1.972	1.227	1.736
1019	5	0	1	1	2	.0541	3.411	.838	1.251	.824	1.177
1020	3	0	1	1	2	.0256	2.924	.528	.697	.520	.692
1021	1	0	1	1	2	.0101	9.450	1.390	2.008	1.367	2.073
1022	-1	0	1	2	2	.0074	0.000	0.000	0.000	0.000	0.000
1023	-3	0	1	1	2	.0175	.442	.072	.099	.071	.107
1024	-5	0	1	1	2	.0406	1.555	.334	.413	.327	.443
1025	-7	0	1	1	2	.0766	2.263	.677	1.137	.661	1.204
1026	-9	0	1	1	2	.1254	2.916	1.224	2.032	1.192	2.094
1027	-11	0	1	1	2	.1872	1.204	.689	0.000	.668	0.000
1028	-10	0	2	1	2	.1625	4.073	2.080	0.000	2.001	0.000
1029	-8	0	2	2	2	.1099	0.000	0.000	0.000	0.000	0.000
1030	-6	0	2	1	2	.0702	3.607	1.023	1.819	.992	1.948
1031	-4	0	2	1	2	.0433	1.370	.303	.404	.294	.424
1032	-2	0	2	1	2	.0294	4.164	.788	1.018	.769	1.034
1033	0	0	2	1	2	.0284	7.145	1.336	1.735	1.305	1.684
1034	2	0	2	1	2	.0402	1.097	.234	.286	.229	.262
1035	4	0	2	1	2	.0650	5.617	1.523	2.410	1.491	2.050
1036	6	0	2	2	2	.1026	0.000	0.000	0.000	0.000	0.000
1037	8	0	2	1	2	.1531	1.131	.552	.717	.540	.507
1038	10	0	2	1	2	.2165	1.785	1.154	0.000	1.129	0.000
1039	10	1	2	1	1	.2168	1.786	1.635	0.000	1.616	0.000
1040	9	1	2	1	1	.1835	1.692	1.347	0.000	1.332	0.000
1041	8	1	2	1	1	.1534	.800	.553	.690	.546	.501
1042	7	1	2	2	1	.1265	0.000	0.000	0.000	0.000	0.000
1043	6	1	2	1	1	.1029	1.740	.895	1.353	.884	1.082
1044	5	1	2	1	1	.0824	1.334	.591	.971	.583	.811
1045	4	1	2	1	1	.0652	.884	.340	.541	.335	.470
1046	3	1	2	1	1	.0513	3.701	1.251	1.935	1.231	1.742
1047	2	1	2	1	1	.0405	1.903	.577	.711	.567	.661
1048	1	1	2	1	1	.0330	3.679	1.027	1.298	1.008	1.245
1049	0	1	2	1	1	.0286	7.337	1.946	2.524	1.908	2.483
1050	-1	1	2	2	1	.0276	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1051	-2	1	2	2	1	.0297	0.000	0.000	0.000	0.000	0.000
1052	-3	1	2	1	1	.0350	2.048	.585	.731	.571	.763
1053	-4	1	2	1	1	.0436	2.097	.657	.883	.639	.933
1054	-5	1	2	2	1	.0554	0.000	0.000	0.000	0.000	0.000
1055	-6	1	2	2	1	.0704	0.000	0.000	0.000	0.000	0.000
1056	-7	1	2	2	1	.0887	0.000	0.000	0.000	0.000	0.000
1057	-8	1	2	2	1	.1101	0.000	0.000	0.000	0.000	0.000
1058	-9	1	2	1	1	.1348	1.088	.681	1.096	.655	1.174
1059	-10	1	2	2	1	.1627	0.000	0.000	0.000	0.000	0.000
1060	-11	1	2	1	1	.1939	.861	.717	0.000	.685	0.000
1061	-11	2	2	1	1	.1947	1.725	1.442	0.000	1.371	0.000
1062	-10	2	2	1	1	.1636	1.999	1.452	0.000	1.386	0.000
1063	-9	2	2	2	1	.1357	0.000	0.000	0.000	0.000	0.000
1064	-8	2	2	1	1	.1110	2.179	1.183	1.853	1.138	1.989
1065	-7	2	2	1	1	.0895	.965	.451	.758	.435	.816
1066	-6	2	2	1	1	.0713	2.561	1.037	1.826	1.003	1.963
1067	-5	2	2	1	1	.0562	3.287	1.165	1.692	1.131	1.811
1068	-4	2	2	1	1	.0444	5.343	1.688	2.318	1.643	2.463
1069	-3	2	2	1	1	.0359	6.019	1.736	2.158	1.695	2.268
1070	-2	2	2	1	1	.0305	.510	.138	.177	.135	.184
1071	-1	2	2	1	1	.0284	.867	.229	.298	.225	.303
1072	0	2	2	1	1	.0295	3.389	.908	1.172	.894	1.168
1073	1	2	2	1	1	.0338	4.222	1.189	1.497	1.173	1.456
1074	2	2	2	1	1	.0413	.552	.169	.213	.167	.202
1075	3	2	2	1	1	.0521	3.219	1.097	1.679	1.086	1.540
1076	4	2	2	1	1	.0661	3.007	1.164	1.893	1.155	1.678
1077	5	2	2	1	1	.0833	1.770	.789	1.300	.784	1.109
1078	6	2	2	2	1	.1037	0.000	0.000	0.000	0.000	0.000
1079	7	2	2	1	1	.1273	1.691	1.015	1.654	1.011	1.296
1080	8	2	2	2	1	.1542	0.000	0.000	0.000	0.000	0.000
1081	9	2	2	1	1	.1843	1.468	1.173	0.000	1.171	0.000
1082	10	2	2	1	1	.2176	2.000	1.836	0.000	1.835	0.000
1083	10	3	2	1	1	.2190	.896	.827	0.000	.836	0.000
1084	9	3	2	2	1	.1857	0.000	0.000	0.000	0.000	0.000
1085	8	3	2	1	1	.1556	3.113	2.174	1.803	2.189	1.383
1086	7	3	2	1	1	.1287	2.399	1.451	2.333	1.459	1.874
1087	6	3	2	1	1	.1051	1.011	.528	.804	.530	.674
1088	5	3	2	1	1	.0846	3.426	1.544	2.555	1.546	2.227
1089	4	3	2	1	1	.0674	4.677	1.832	3.079	1.830	2.782
1090	3	3	2	1	1	.0535	1.674	.578	.870	.576	.812
1091	2	3	2	1	1	.0427	2.672	.829	1.087	.824	1.045
1092	1	3	2	1	1	.0352	6.416	1.836	2.292	1.818	2.260

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1093	0	3	2	2	1	.0308	0.000	0.000	0.000	0.000	0.000
1094	-1	3	2	1	1	.0298	3.039	.817	1.052	.804	1.082
1095	-2	3	2	1	1	.0319	1.631	.450	.572	.441	.598
1096	-3	3	2	1	1	.0372	3.179	.931	1.148	.910	1.214
1097	-4	3	2	2	1	.0458	0.000	0.000	0.000	0.000	0.000
1098	-5	3	2	1	1	.0576	1.351	.485	.692	.471	.743
1099	-6	3	2	1	1	.0726	.644	.264	.459	.255	.494
1100	-7	3	2	1	1	.0909	1.533	.724	1.207	.698	1.297
1101	-8	3	2	1	1	.1123	1.031	.565	.900	.542	.964
1102	-9	3	2	1	1	.1370	.773	.490	.793	.468	.842
1103	-10	3	2	1	1	.1649	1.157	.846	0.000	.805	0.000
1104	-11	3	2	1	1	.1961	.864	.727	0.000	.688	0.000
1105	-11	4	2	1	1	.1980	3.126	2.650	0.000	2.497	0.000
1106	-10	4	2	1	1	.1669	1.643	1.212	0.000	1.148	0.000
1107	-9	4	2	2	1	.1390	0.000	0.000	0.000	0.000	0.000
1108	-8	4	2	2	1	.1143	0.000	0.000	0.000	0.000	0.000
1109	-7	4	2	2	1	.0928	0.000	0.000	0.000	0.000	0.000
1110	-6	4	2	1	1	.0746	1.123	.467	.799	.452	.860
1111	-5	4	2	2	1	.0595	0.000	0.000	0.000	0.000	0.000
1112	-4	4	2	1	1	.0477	3.764	1.229	1.833	1.199	1.963
1113	-3	4	2	1	1	.0392	4.961	1.483	1.809	1.452	1.923
1114	-2	4	2	1	1	.0338	.741	.209	.263	.205	.276
1115	-1	4	2	2	1	.0317	0.000	0.000	0.000	0.000	0.000
1116	0	4	2	2	1	.0328	0.000	0.000	0.000	0.000	0.000
1117	1	4	2	1	1	.0371	4.740	1.385	1.710	1.378	1.709
1118	2	4	2	1	1	.0446	1.870	.592	.817	.591	.797
1119	3	4	2	1	1	.0554	3.635	1.278	1.877	1.280	1.782
1120	4	4	2	1	1	.0694	1.101	.438	.770	.441	.709
1121	5	4	2	2	1	.0866	0.000	0.000	0.000	0.000	0.000
1122	6	4	2	2	1	.1070	0.000	0.000	0.000	0.000	0.000
1123	7	4	2	1	1	.1306	1.867	1.142	1.815	1.158	1.494
1124	8	4	2	2	1	.1575	0.000	0.000	0.000	0.000	0.000
1125	9	4	2	1	1	.1876	3.409	2.763	0.000	2.817	0.000
1126	10	4	2	1	1	.2209	1.557	1.448	0.000	1.480	0.000
1127	10	5	2	2	1	.2234	0.000	0.000	0.000	0.000	0.000
1128	9	5	2	1	1	.1901	2.096	1.718	0.000	1.769	0.000
1129	8	5	2	1	1	.1600	1.986	1.417	.004	1.455	.003
1130	7	5	2	1	1	.1331	3.341	2.071	3.316	2.120	2.794
1131	6	5	2	1	1	.1095	1.914	1.029	1.588	1.049	1.391
1132	5	5	2	1	1	.0890	1.928	.898	1.507	.913	1.368
1133	4	5	2	1	1	.0718	.642	.261	.457	.264	.429
1134	3	5	2	1	1	.0578	6.456	2.322	3.304	2.340	3.187

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1135	2	5	2	1	1	.0471	2.621	.850	1.249	.854	1.235
1136	1	5	2	1	1	.0396	5.432	1.631	1.984	1.630	2.007
1137	0	5	2	1	1	.0352	3.221	.922	1.151	.918	1.186
1138	-1	5	2	1	1	.0341	1.389	.393	.494	.389	.517
1139	-2	5	2	1	1	.0363	1.307	.379	.470	.373	.498
1140	-3	5	2	1	1	.0416	2.767	.849	1.081	.833	1.155
1141	-4	5	2	1	1	.0502	1.008	.337	.528	.329	.568
1142	-5	5	2	2	1	.0620	0.000	0.000	0.000	0.000	0.000
1143	-6	5	2	2	1	.0770	0.000	0.000	0.000	0.000	0.000
1144	-7	5	2	2	1	.0953	0.000	0.000	0.000	0.000	0.000
1145	-8	5	2	2	1	.1167	0.000	0.000	0.000	0.000	0.000
1146	-9	5	2	2	1	.1414	0.000	0.000	0.000	0.000	0.000
1147	-10	5	2	1	1	.1693	1.167	.871	0.000	.822	0.000
1148	-11	5	2	1	1	.2005	1.741	1.491	0.000	1.399	0.000
1149	-11	6	2	1	1	.2035	2.315	2.007	0.000	1.876	0.000
1150	-10	6	2	2	1	.1724	0.000	0.000	0.000	0.000	0.000
1151	-9	6	2	1	1	.1445	2.357	1.554	2.723	1.472	2.839
1152	-8	6	2	1	1	.1158	1.661	.953	1.663	.909	1.757
1153	-7	6	2	2	1	.0983	0.000	0.000	0.000	0.000	0.000
1154	-6	6	2	1	1	.0801	3.683	1.601	2.610	1.546	2.802
1155	-5	6	2	1	1	.0650	3.244	1.245	1.973	1.209	2.126
1156	-4	6	2	1	1	.0532	4.617	1.590	2.400	1.554	2.585
1157	-3	6	2	1	1	.0447	6.906	2.186	3.021	2.148	3.242
1158	-2	6	2	1	1	.0393	.944	.283	.344	.279	.367
1159	-1	6	2	1	1	.0372	.760	.222	.274	.221	.289
1160	0	6	2	2	1	.0383	0.000	0.000	0.000	0.000	0.000
1161	1	6	2	1	1	.0426	1.575	.488	.638	.490	.653
1162	2	6	2	2	1	.0501	0.000	0.000	0.000	0.000	0.000
1163	3	6	2	1	1	.0609	1.226	.453	.643	.460	.630
1164	4	6	2	1	1	.0749	1.590	.663	1.132	.676	1.079
1165	5	6	2	2	1	.0921	0.000	0.000	0.000	0.000	0.000
1166	6	6	2	1	1	.1125	.729	.400	.639	.411	.571
1167	7	6	2	2	1	.1361	0.000	0.000	0.000	0.000	0.000
1168	8	6	2	1	1	.1630	1.153	.835	0.000	.866	0.000
1169	9	6	2	1	1	.1931	1.490	1.237	0.000	1.287	0.000
1170	9	7	2	2	1	.1967	0.000	0.000	0.000	0.000	0.000
1171	8	7	2	2	1	.1666	0.000	0.000	0.000	0.000	0.000
1172	7	7	2	1	1	.1397	1.905	1.225	1.996	1.276	1.758
1173	6	7	2	2	1	.1161	0.000	0.000	0.000	0.000	0.000
1174	5	7	2	1	1	.0956	2.410	1.179	1.859	1.216	1.751
1175	4	7	2	1	1	.0784	2.941	1.263	2.087	1.295	2.022
1176	3	7	2	1	1	.0644	.623	.238	.371	.243	.369

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1177	2	7	2	1	1	.0537	1.185	.410	.615	.416	.625
1178	1	7	2	2	1	.0461	0.000	0.000	0.000	0.000	0.000
1179	0	7	2	1	1	.0418	1.662	.511	.654	.513	.687
1180	-1	7	2	2	1	.0407	0.000	0.000	0.000	0.000	0.000
1181	-2	7	2	1	1	.0429	1.932	.601	.791	.595	.848
1182	-3	7	2	1	1	.0482	1.287	.422	.637	.416	.686
1183	-4	7	2	1	1	.0568	1.996	.711	1.025	.695	1.106
1184	-5	7	2	2	1	.0686	0.000	0.000	0.000	0.000	0.000
1185	-6	7	2	1	1	.0836	1.497	.670	1.104	.646	1.183
1186	-7	7	2	1	1	.1019	1.227	.627	.945	.601	1.004
1187	-8	7	2	2	1	.1233	0.000	0.000	0.000	0.000	0.000
1188	-9	7	2	1	1	.1480	.791	.532	.983	.502	1.017
1189	-10	7	2	2	1	.1759	0.000	0.000	0.000	0.000	0.000
1190	-11	7	2	2	1	.2071	C.000	0.000	0.000	0.000	0.000
1191	-11	8	2	1	1	.2112	.885	.792	0.000	.734	0.000
1192	-10	8	2	1	1	.1801	.841	.659	0.000	.616	0.000
1193	-9	8	2	2	1	.1521	0.000	0.000	0.000	0.000	0.000
1194	-8	8	2	2	1	.1275	0.000	0.000	0.000	0.000	0.000
1195	-7	8	2	1	1	.1060	2.150	1.130	1.725	1.081	1.824
1196	-6	8	2	2	1	.0877	0.000	0.000	0.000	0.000	0.000
1197	-5	8	2	1	1	.0727	1.577	.646	1.124	.628	1.209
1198	-4	8	2	1	1	.0609	3.576	1.323	1.879	1.295	2.029
1199	-3	8	2	1	1	.0524	1.442	.492	.751	.485	.811
1200	-2	8	2	1	1	.0470	2.742	.889	1.302	.882	1.401
1201	-1	8	2	2	1	.0449	0.000	0.000	0.000	0.000	0.000
1202	0	8	2	2	1	.0460	0.000	0.000	0.000	0.000	0.000
1203	1	8	2	1	1	.0503	2.968	.994	1.556	1.007	1.625
1204	2	8	2	1	1	.0578	1.481	.532	.758	.543	.779
1205	3	8	2	1	1	.0686	1.417	.560	.967	.575	.974
1206	4	8	2	1	1	.0825	2.002	.888	1.458	.917	1.435
1207	5	8	2	1	1	.0998	1.575	.793	1.191	.824	1.141
1208	6	8	2	1	1	.1202	.743	.428	.747	.447	.695
1209	7	8	2	2	1	.1438	0.000	0.000	0.000	0.000	0.000
1210	8	8	2	1	1	.1707	2.026	1.522	0.000	1.609	0.000
1211	9	8	2	1	1	.2008	2.305	1.976	0.000	2.101	0.000
1212	9	9	2	2	1	.2055	0.000	0.000	0.000	0.000	0.000
1213	8	9	2	1	1	.1754	1.180	.905	0.000	.967	0.000
1214	7	9	2	2	1	.1485	0.000	0.000	0.000	0.000	0.000
1215	6	9	2	2	1	.1249	0.000	0.000	0.000	0.000	0.000
1216	5	9	2	1	1	.1044	1.748	.909	1.381	.952	1.345
1217	4	9	2	1	1	.0872	1.515	.696	1.162	.724	1.161
1218	3	9	2	1	1	.0732	1.443	.594	1.028	.613	1.049

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1219	2	9	2	1	1	.0625	2.048	.768	1.140	.788	1.184
1220	1	9	2	1	1	.0549	1.033	.362	.534	.368	.563
1221	0	9	2	1	1	.0506	1.650	.554	.864	.560	.921
1222	-1	9	2	1	1	.0495	1.160	.385	.599	.387	.644
1223	-2	9	2	1	1	.0517	3.317	1.126	1.732	1.121	1.871
1224	-3	9	2	2	1	.0570	0.000	0.000	0.000	0.000	0.000
1225	-4	9	2	1	1	.0656	1.533	.591	.950	.579	1.026
1226	-5	9	2	1	1	.0774	.927	.395	.658	.383	.707
1227	-6	9	2	1	1	.0924	.689	.329	.539	.317	.574
1228	-7	9	2	1	1	.1107	1.257	.681	1.062	.651	1.117
1229	-8	9	2	2	1	.1321	0.000	0.000	0.000	0.000	0.000
1230	-9	9	2	2	1	.1568	0.000	0.000	0.000	0.000	0.000
1231	-10	9	2	2	1	.1847	0.000	0.000	0.000	0.000	0.000
1232	-11	9	2	1	1	.2159	.892	.813	0.000	.750	0.000
1233	-11	10	2	1	1	.2211	1.271	1.183	0.000	1.087	0.000
1234	-10	10	2	1	1	.1900	.856	.701	0.000	.650	0.000
1235	-9	10	2	1	1	.1620	1.994	1.437	0.000	1.347	0.000
1236	-8	10	2	1	1	.1374	1.340	.851	1.377	.805	1.415
1237	-7	10	2	1	1	.1159	1.645	.922	1.536	.880	1.605
1238	-6	10	2	2	1	.0976	0.000	0.000	0.000	0.000	0.000
1239	-5	10	2	1	1	.0826	2.752	1.221	2.007	1.187	2.149
1240	-4	10	2	1	1	.0708	7.644	3.083	5.451	3.024	5.879
1241	-3	10	2	1	1	.0622	3.998	1.496	2.205	1.481	2.388
1242	-2	10	2	1	1	.0569	1.593	.568	.818	.567	.886
1243	-1	10	2	1	1	.0548	2.664	.931	1.379	.937	1.489
1244	0	10	2	2	1	.0559	0.000	0.000	0.000	0.000	0.000
1245	1	10	2	1	1	.0602	2.117	.778	1.081	.796	1.150
1246	2	10	2	1	1	.0677	.631	.248	.419	.256	.440
1247	3	10	2	1	1	.0785	1.740	.747	1.235	.777	1.275
1248	4	10	2	1	1	.0924	1.541	.736	1.205	.771	1.221
1249	5	10	2	1	1	.1096	.724	.390	.602	.411	.596
1250	6	10	2	2	1	.1301	0.000	0.000	0.000	0.000	0.000
1251	7	10	2	1	1	.1537	1.961	1.357	1.607	1.453	1.504
1252	8	10	2	1	1	.1806	1.191	.936	0.000	1.009	0.000
1253	9	10	2	2	1	.2107	0.000	0.000	0.000	0.000	0.000
1254	9	11	2	1	1	.2165	1.546	1.413	0.000	1.551	0.000
1255	8	11	2	2	1	.1864	0.000	0.000	0.000	0.000	0.000
1256	7	11	2	2	1	.1595	0.000	0.000	0.000	0.000	0.000
1257	6	11	2	1	1	.1358	2.313	1.456	2.349	1.562	2.304
1258	5	11	2	2	1	.1154	0.000	0.000	0.000	0.000	0.000
1259	4	11	2	1	1	.0982	2.804	1.397	2.137	1.474	2.194
1260	3	11	2	1	1	.0842	2.511	1.128	1.864	1.180	1.947

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1261	2	11	2	1	1	.0735	2.042	.842	1.455	.873	1.542
1262	1	11	2	2	1	.0659	0.000	0.000	0.000	0.000	0.000
1263	0	11	2	2	1	.0616	0.000	0.000	0.000	0.000	0.000
1264	-1	11	2	1	1	.0605	1.936	.713	1.002	.721	1.087
1265	-2	11	2	2	1	.0627	0.000	0.000	0.000	0.000	0.000
1266	-3	11	2	1	1	.0680	1.548	.610	1.038	.604	1.125
1267	-4	11	2	1	1	.0766	1.728	.731	1.228	.718	1.323
1268	-5	11	2	1	1	.0884	1.178	.546	.915	.531	.976
1269	-6	11	2	1	1	.1034	1.591	.822	1.244	.792	1.311
1270	-7	11	2	2	1	.1217	0.000	0.000	0.000	0.000	0.000
1271	-8	11	2	1	1	.1431	2.073	1.357	2.329	1.282	2.371
1272	-9	11	2	2	1	.1678	0.000	0.000	0.000	0.000	0.000
1273	-10	11	2	2	1	.1957	0.000	0.000	0.000	0.000	0.000
1274	-10	12	2	1	1	.2020	.873	.752	0.000	.694	0.000
1275	-9	12	2	1	1	.1741	2.039	1.556	0.000	1.451	0.000
1276	-8	12	2	1	1	.1494	.794	.537	1.013	.506	1.021
1277	-7	12	2	1	1	.1280	.757	.456	.739	.435	.761
1278	-6	12	2	1	1	.1097	1.448	.780	1.205	.751	1.262
1279	-5	12	2	1	1	.0947	1.202	.584	.931	.568	.989
1280	-4	12	2	1	1	.0829	.668	.297	.489	.292	.525
1281	-3	12	2	1	1	.0743	1.587	.659	1.130	.655	1.223
1282	-2	12	2	1	1	.0690	2.538	1.008	1.755	1.011	1.908
1283	-1	12	2	2	1	.0669	0.000	0.000	0.000	0.000	0.000
1284	0	12	2	2	1	.0679	0.000	0.000	0.000	0.000	0.000
1285	1	12	2	1	1	.0723	1.928	.787	1.374	.813	1.483
1286	2	12	2	1	1	.0798	1.145	.497	.811	.518	.867
1287	3	12	2	2	1	.0906	0.000	0.000	0.000	0.000	0.000
1288	4	12	2	1	1	.1045	.714	.371	.564	.395	.587
1289	5	12	2	2	1	.1217	0.000	0.000	0.000	0.000	0.000
1290	6	12	2	1	1	.1422	1.106	.720	1.217	.779	1.214
1291	7	12	2	2	1	.1658	0.000	0.000	0.000	0.000	0.000
1292	8	12	2	2	1	.1927	0.000	0.000	0.000	0.000	0.000
1293	9	12	2	1	1	.2228	1.274	1.194	0.000	1.325	0.000
1294	8	13	2	2	1	.1996	0.000	0.000	0.000	0.000	0.000
1295	7	13	2	1	1	.1727	1.438	1.090	0.000	1.200	0.000
1296	6	13	2	1	1	.1490	1.586	1.071	2.008	1.169	2.034
1297	5	13	2	2	1	.1286	0.000	0.000	0.000	0.000	0.000
1298	4	13	2	1	1	.1114	.727	.396	.624	.424	.656
1299	3	13	2	1	1	.0974	3.831	1.898	2.931	2.011	3.126
1300	2	13	2	2	1	.0867	0.000	0.000	0.000	0.000	0.000
1301	1	13	2	2	1	.0791	0.000	0.000	0.000	0.000	0.000
1302	0	13	2	1	1	.0748	1.124	.469	.800	.482	.872

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1303	-1	13	2	1	1	.0737	1.583	.654	1.128	.665	1.230
1304	-2	13	2	1	1	.0759	1.303	.548	.927	.551	1.008
1305	-3	13	2	2	1	.0812	0.000	0.000	0.000	0.000	0.000
1306	-4	13	2	2	1	.0898	0.000	0.000	0.000	0.000	0.000
1307	-5	13	2	2	1	.1016	0.000	0.000	0.000	0.000	0.000
1308	-6	13	2	2	1	.1166	0.000	0.000	0.000	0.000	0.000
1309	-7	13	2	2	1	.1348	0.000	0.000	0.000	0.000	0.000
1310	-8	13	2	2	1	.1563	0.000	0.000	0.000	0.000	0.000
1311	-9	13	2	1	1	.1810	.843	.663	0.000	.617	0.000
1312	-10	13	2	1	1	.2089	2.496	2.213	0.000	2.034	0.000
1313	-10	14	2	1	1	.2163	1.785	1.630	0.000	1.494	0.000
1314	-9	14	2	2	1	.1884	0.000	0.000	0.000	0.000	0.000
1315	-8	14	2	1	1	.1637	1.155	.839	0.000	.789	0.000
1316	-7	14	2	1	1	.1423	.782	.510	.863	.485	.872
1317	-6	14	2	2	1	.1240	0.000	0.000	0.000	0.000	0.000
1318	-5	14	2	1	1	.1090	1.770	.949	1.462	.924	1.538
1319	-4	14	2	1	1	.0972	1.977	.978	1.514	.964	1.616
1320	-3	14	2	1	1	.0886	.681	.316	.530	.315	.572
1321	-2	14	2	1	1	.0833	.946	.422	.695	.426	.756
1322	-1	14	2	1	1	.0811	1.328	.582	.953	.594	1.041
1323	0	14	2	1	1	.0822	1.154	.511	.838	.527	.917
1324	1	14	2	2	1	.0865	0.000	0.000	0.000	0.000	0.000
1325	2	14	2	2	1	.0941	0.000	0.000	0.000	0.000	0.000
1326	3	14	2	1	1	.1048	.714	.373	.567	.397	.610
1327	4	14	2	1	1	.1188	1.048	.598	1.032	.644	1.097
1328	5	14	2	1	1	.1360	1.725	1.087	1.754	1.184	1.836
1329	6	14	2	1	1	.1565	1.610	1.129	.751	1.243	.772
1330	7	14	2	1	1	.1801	2.790	2.188	0.000	2.432	0.000
1331	8	14	2	1	1	.2070	1.244	1.094	0.000	1.229	0.000
1332	8	15	2	2	1	.2149	0.000	0.000	0.000	0.000	0.000
1333	7	15	2	1	1	.1881	1.206	.980	0.000	1.100	0.000
1334	6	15	2	2	1	.1644	0.000	0.000	0.000	0.000	0.000
1335	5	15	2	1	1	.1440	1.110	.730	1.270	.802	1.346
1336	4	15	2	1	1	.1268	2.266	1.356	2.221	1.472	2.386
1337	3	15	2	1	1	.1128	2.064	1.134	1.819	1.218	1.974
1338	2	15	2	2	1	.1021	0.000	0.000	0.000	0.000	0.000
1339	1	15	2	1	1	.0945	.693	.336	.538	.353	.590
1340	0	15	2	1	1	.0902	2.052	.965	1.620	1.000	1.777
1341	-1	15	2	1	1	.0891	1.364	.636	1.067	.651	1.167
1342	-2	15	2	1	1	.0912	.971	.460	.763	.465	.829
1343	-3	15	2	1	1	.0966	1.846	.909	1.418	.909	1.526
1344	-4	15	2	1	1	.1052	2.948	1.541	2.346	1.521	2.492

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1345	-5	15	2	1	1	.1170	1.475	.832	1.405	.811	1.468
1346	-6	15	2	2	1	.1320	0.000	0.000	0.000	0.000	0.000
1347	-7	15	2	1	1	.1502	1.377	.936	1.736	.890	1.737
1348	-8	15	2	2	1	.1717	0.000	0.000	0.000	0.000	0.000
1349	-9	15	2	2	1	.1964	0.000	0.000	0.000	0.000	0.000
1350	-10	15	2	1	1	.2243	2.020	1.903	0.000	1.739	0.000
1351	-9	16	2	1	1	.2049	1.754	1.530	0.000	1.413	0.000
1352	-8	16	2	1	1	.1802	1.457	1.143	0.000	1.071	0.000
1353	-7	16	2	1	1	.1588	.809	.574	.133	.545	.132
1354	-6	16	2	2	1	.1405	0.000	0.000	0.000	0.000	0.000
1355	-5	16	2	1	1	.1255	.753	.447	.742	.436	.770
1356	-4	16	2	1	1	.1137	2.737	1.512	2.453	1.495	2.591
1357	-3	16	2	1	1	.1051	1.238	.647	.985	.648	1.056
1358	-2	16	2	1	1	.0998	1.575	.793	1.191	.805	1.292
1359	-1	16	2	1	1	.0976	1.979	.982	1.513	1.010	1.655
1360	0	16	2	2	1	.0987	0.000	0.000	0.000	0.000	0.000
1361	1	16	2	2	1	.1030	0.000	0.000	0.000	0.000	0.000
1362	2	16	2	1	1	.1106	3.974	2.152	3.353	2.297	3.685
1363	3	16	2	1	1	.1213	1.291	.748	1.292	.808	1.413
1364	4	16	2	2	1	.1353	0.000	0.000	0.000	0.000	0.000
1365	5	16	2	2	1	.1525	0.000	0.000	0.000	0.000	0.000
1366	6	16	2	1	1	.1729	2.197	1.668	0.000	1.868	0.000
1367	7	16	2	1	1	.1966	1.498	1.262	0.000	1.431	0.000
1368	8	16	2	2	1	.2235	0.000	0.000	0.000	0.000	0.000
1369	7	17	2	1	1	.2057	1.241	1.086	0.000	1.243	0.000
1370	6	17	2	2	1	.1820	0.000	0.000	0.000	0.000	0.000
1371	5	17	2	1	1	.1616	2.439	1.755	0.000	1.958	0.000
1372	4	17	2	2	1	.1444	0.000	0.000	0.000	0.000	0.000
1373	3	17	2	1	1	.1304	1.523	.930	1.478	1.012	1.628
1374	2	17	2	2	1	.1196	0.000	0.000	0.000	0.000	0.000
1375	1	17	2	2	1	.1121	0.000	0.000	0.000	0.000	0.000
1376	0	17	2	1	1	.1078	2.037	1.083	1.663	1.133	1.831
1377	-1	17	2	1	1	.1067	2.781	1.468	2.247	1.515	2.456
1378	-2	17	2	1	1	.1088	.722	.387	.596	.394	.645
1379	-3	17	2	1	1	.1142	.732	.406	.663	.408	.707
1380	-4	17	2	1	1	.1228	1.673	.978	1.666	.968	1.749
1381	-5	17	2	1	1	.1346	1.538	.961	1.545	.939	1.590
1382	-6	17	2	1	1	.1496	.794	.538	1.016	.518	1.021
1383	-7	17	2	2	1	.1678	0.000	0.000	0.000	0.000	0.000
1384	-8	17	2	1	1	.1893	1.209	.987	0.000	.923	0.000
1385	-9	17	2	2	1	.2140	0.000	0.000	0.000	0.000	0.000
1386	-9	18	2	2	1	.2236	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1387	-8	18	2	1	1	.1989	1.504	1.280	0.000	1.195	0.000
1388	-7	18	2	2	1	.1774	0.000	0.000	0.000	0.000	0.000
1389	-6	18	2	1	1	.1592	1.145	.814	.122	.784	.121
1390	-5	18	2	1	1	.1442	1.756	1.156	2.017	1.130	2.057
1391	-4	18	2	1	1	.1324	3.589	2.216	3.541	2.198	3.692
1392	-3	18	2	1	1	.1238	1.677	.986	1.663	.992	1.767
1393	-2	18	2	1	1	.1184	.740	.421	.724	.430	.781
1394	-1	18	2	1	1	.1163	1.041	.585	.980	.606	1.070
1395	0	18	2	1	1	.1174	1.279	.723	1.228	.760	1.352
1396	1	18	2	1	1	.1217	1.828	1.062	1.827	1.131	2.023
1397	2	18	2	2	1	.1293	0.000	0.000	0.000	0.000	0.000
1398	3	18	2	1	1	.1400	2.059	1.326	2.163	1.452	2.396
1399	4	18	2	1	1	.1540	1.388	.961	1.087	1.067	1.199
1400	5	18	2	2	1	.1712	0.000	0.000	0.000	0.000	0.000
1401	6	18	2	1	1	.1916	1.213	1.001	0.000	1.141	0.000
1402	7	18	2	2	1	.2153	0.000	0.000	0.000	0.000	0.000
1403	6	19	2	1	1	.2018	2.137	1.840	0.000	2.117	0.000
1404	5	19	2	2	1	.1814	0.000	0.000	0.000	0.000	0.000
1405	4	19	2	1	1	.1642	2.162	1.575	0.000	1.761	0.000
1406	3	19	2	2	1	.1502	0.000	0.000	0.000	0.000	0.000
1407	2	19	2	2	1	.1394	0.000	0.000	0.000	0.000	0.000
1408	1	19	2	1	1	.1319	.764	.471	.751	.504	.833
1409	0	19	2	1	1	.1276	1.070	.643	1.046	.679	1.151
1410	-1	19	2	2	1	.1265	0.000	0.000	0.000	0.000	0.000
1411	-2	19	2	2	1	.1286	0.000	0.000	0.000	0.000	0.000
1412	-3	19	2	1	1	.1340	2.172	1.353	2.171	1.365	2.294
1413	-4	19	2	1	1	.1425	2.595	1.694	2.880	1.683	2.981
1414	-5	19	2	2	1	.1543	0.000	0.000	0.000	0.000	0.000
1415	-6	19	2	2	1	.1694	0.000	0.000	0.000	0.000	0.000
1416	-7	19	2	2	1	.1876	0.000	0.000	0.000	0.000	0.000
1417	-8	19	2	1	1	.2091	.883	.783	0.000	.731	0.000
1418	-8	20	2	2	1	.2198	0.000	0.000	0.000	0.000	0.000
1419	-7	20	2	2	1	.1983	0.000	0.000	0.000	0.000	0.000
1420	-6	20	2	2	1	.1801	0.000	0.000	0.000	0.000	0.000
1421	-5	20	2	1	1	.1651	2.166	1.584	0.000	1.551	0.000
1422	-4	20	2	1	1	.1533	2.263	1.562	1.986	1.554	2.038
1423	-3	20	2	1	1	.1447	2.080	1.373	2.414	1.388	2.534
1424	-2	20	2	1	1	.1393	1.099	.705	1.148	.724	1.228
1425	-1	20	2	1	1	.1372	1.895	1.202	1.945	1.254	2.113
1426	0	20	2	2	1	.1383	0.000	0.000	0.000	0.000	0.000
1427	1	20	2	2	1	.1426	0.000	0.000	0.000	0.000	0.000
1428	2	20	2	1	1	.1501	1.124	.764	1.430	.835	1.596

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1429	3	20	2	2	1	.1609	0.000	0.000	0.000	0.000	0.000
1430	4	20	2	1	1	.1749	1.667	1.276	0.000	1.438	0.000
1431	5	20	2	1	1	.1921	1.717	1.419	0.000	1.624	0.000
1432	6	20	2	2	1	.2125	0.000	0.000	0.000	0.000	0.000
1433	6	21	2	1	1	.2238	1.805	1.698	0.000	1.989	0.000
1434	5	21	2	2	1	.2034	0.000	0.000	0.000	0.000	0.000
1435	4	21	2	2	1	.1862	0.000	0.000	0.000	0.000	0.000
1436	3	21	2	1	1	.1722	.829	.627	0.000	.701	0.000
1437	2	21	2	2	1	.1614	0.000	0.000	0.000	0.000	0.000
1438	1	21	2	1	1	.1539	1.133	.784	.906	.849	1.005
1439	0	21	2	1	1	.1496	1.375	.931	1.759	.992	1.931
1440	-1	21	2	2	1	.1485	0.000	0.000	0.000	0.000	0.000
1441	-2	21	2	1	1	.1506	1.378	.938	1.674	.967	1.781
1442	-3	21	2	1	1	.1560	.804	.563	.428	.570	.445
1443	-4	21	2	1	1	.1645	1.828	1.334	0.000	1.330	0.000
1444	-5	21	2	2	1	.1763	0.000	0.000	0.000	0.000	0.000
1445	-6	21	2	1	1	.1914	1.715	1.413	0.000	1.361	0.000
1446	-7	21	2	2	1	.2096	0.000	0.000	0.000	0.000	0.000
1447	-7	22	2	2	1	.2214	0.000	0.000	0.000	0.000	0.000
1448	-6	22	2	1	1	.2032	2.142	1.855	0.000	1.788	0.000
1449	-5	22	2	2	1	.1881	0.000	0.000	0.000	0.000	0.000
1450	-4	22	2	1	1	.1763	1.182	.911	0.000	.910	0.000
1451	-3	22	2	1	1	.1678	1.645	1.219	0.000	1.239	0.000
1452	-2	22	2	1	1	.1624	2.443	1.765	0.000	1.825	0.000
1453	-1	22	2	1	1	.1603	1.814	1.296	0.000	1.364	0.000
1454	0	22	2	2	1	.1614	0.000	0.000	0.000	0.000	0.000
1455	1	22	2	1	1	.1657	2.007	1.473	0.000	1.603	0.000
1456	2	22	2	2	1	.1732	0.000	0.000	0.000	0.000	0.000
1457	3	22	2	1	1	.1840	1.694	1.351	0.000	1.521	0.000
1458	4	22	2	2	1	.1980	0.000	0.000	0.000	0.000	0.000
1459	5	22	2	1	1	.2152	1.992	1.811	0.000	2.107	0.000
1460	4	23	2	1	1	.2103	2.796	2.494	0.000	2.876	0.000
1461	3	23	2	1	1	.1964	.865	.728	0.000	.825	0.000
1462	2	23	2	2	1	.1856	0.000	0.000	0.000	0.000	0.000
1463	1	23	2	1	1	.1781	1.874	1.456	0.000	1.594	0.000
1464	0	23	2	1	1	.1737	2.037	1.552	0.000	1.669	0.000
1465	-1	23	2	1	1	.1727	2.625	1.989	0.000	2.102	0.000
1466	-2	23	2	1	1	.1748	2.205	1.687	0.000	1.751	0.000
1467	-3	23	2	2	1	.1801	0.000	0.000	0.000	0.000	0.000
1468	-4	23	2	1	1	.1887	1.479	1.205	0.000	1.205	0.000
1469	-5	23	2	2	1	.2005	0.000	0.000	0.000	0.000	0.000
1470	-6	23	2	2	1	.2155	C.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1471	-5	24	2	2	1	.2134	0.000	0.000	0.000	0.000	0.000
1472	-4	24	2	1	1	.2016	3.264	2.808	0.000	2.815	0.000
1473	-3	24	2	1	1	.1931	1.720	1.428	0.000	1.458	0.000
1474	-2	24	2	1	1	.1877	1.476	1.197	0.000	1.246	0.000
1475	-1	24	2	1	1	.1856	1.201	.965	0.000	1.023	0.000
1476	0	24	2	1	1	.1867	.851	.687	0.000	.742	0.000
1477	1	24	2	1	1	.1910	1.212	.997	0.000	1.097	0.000
1478	2	24	2	2	1	.1985	0.000	0.000	0.000	0.000	0.000
1479	3	24	2	2	1	.2093	0.000	0.000	0.000	0.000	0.000
1480	4	24	2	2	1	.2233	0.000	0.000	0.000	0.000	0.000
1481	3	25	2	1	1	.2227	2.549	2.387	0.000	2.745	0.000
1482	2	25	2	2	1	.2120	0.000	0.000	0.000	0.000	0.000
1483	1	25	2	1	1	.2044	1.752	1.525	0.000	1.689	0.000
1484	0	25	2	2	1	.2001	0.000	0.000	0.000	0.000	0.000
1485	-1	25	2	1	1	.1990	1.228	1.046	0.000	1.114	0.000
1486	-2	25	2	1	1	.2012	1.510	1.296	0.000	1.354	0.000
1487	-3	25	2	1	1	.2065	2.326	2.042	0.000	2.092	0.000
1488	-4	25	2	1	1	.2151	1.543	1.402	0.000	1.409	0.000
1489	-3	26	2	2	1	.2205	0.000	0.000	0.000	0.000	0.000
1490	-2	26	2	1	1	.2152	.891	.810	0.000	.849	0.000
1491	-1	26	2	1	1	.2130	.888	.801	0.000	.856	0.000
1492	0	26	2	1	1	.2141	.889	.805	0.000	.879	0.000
1493	1	26	2	1	1	.2185	.895	.825	0.000	.918	0.000
1494	0	24	3	2	1	.2221	0.000	0.000	0.000	0.000	0.000
1495	-1	24	3	2	1	.2197	0.000	0.000	0.000	0.000	0.000
1496	-2	24	3	1	1	.2205	2.008	1.864	0.000	2.001	0.000
1497	-4	23	3	1	1	.2188	1.267	1.168	0.000	1.202	0.000
1498	-3	23	3	1	1	.2115	2.802	2.511	0.000	2.632	0.000
1499	-2	23	3	1	1	.2075	.880	.776	0.000	.829	0.000
1500	-1	23	3	2	1	.2068	0.000	0.000	0.000	0.000	0.000
1501	0	23	3	1	1	.2092	1.974	1.752	0.000	1.941	0.000
1502	1	23	3	2	1	.2149	0.000	0.000	0.000	0.000	0.000
1503	2	23	3	2	1	.2238	0.000	0.000	0.000	0.000	0.000
1504	3	22	3	1	1	.2235	.902	.848	0.000	.982	0.000
1505	2	22	3	2	1	.2114	0.000	0.000	0.000	0.000	0.000
1506	1	22	3	1	1	.2025	.873	.754	0.000	.845	0.000
1507	0	22	3	1	1	.1968	1.731	1.460	0.000	1.607	0.000
1508	-1	22	3	1	1	.1944	2.111	1.762	0.000	1.906	0.000
1509	-2	22	3	1	1	.1952	2.589	2.168	0.000	2.304	0.000
1510	-3	22	3	1	1	.1992	1.738	1.480	0.000	1.545	0.000
1511	-4	22	3	2	1	.2064	0.000	0.000	0.000	0.000	0.000
1512	-5	22	3	2	1	.2169	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1513	-6	21	3	2	1	.2187	0.000	0.000	0.000	0.000	0.000
1514	-5	21	3	2	1	.2050	0.000	0.000	0.000	0.000	0.000
1515	-4	21	3	1	1	.1946	.849	.709	0.000	.725	0.000
1516	-3	21	3	1	1	.1874	1.874	1.517	0.000	1.577	0.000
1517	-2	21	3	1	1	.1834	2.497	1.986	0.000	2.100	0.000
1518	-1	21	3	1	1	.1826	1.859	1.474	0.000	1.585	0.000
1519	0	21	3	2	1	.1850	0.000	0.000	0.000	0.000	0.000
1520	1	21	3	1	1	.1907	2.919	2.398	0.000	2.666	0.000
1521	2	21	3	2	1	.1996	0.000	0.000	0.000	0.000	0.000
1522	3	21	3	2	1	.2117	0.000	0.000	0.000	0.000	0.000
1523	4	20	3	1	1	.2158	2.320	2.114	0.000	2.446	0.000
1524	3	20	3	1	1	.2004	1.713	1.466	0.000	1.670	0.000
1525	2	20	3	2	1	.1883	0.000	0.000	0.000	0.000	0.000
1526	1	20	3	1	1	.1794	1.431	1.118	0.000	1.235	0.000
1527	0	20	3	2	1	.1738	0.000	0.000	0.000	0.000	0.000
1528	-1	20	3	2	1	.1713	0.000	0.000	0.000	0.000	0.000
1529	-2	20	3	1	1	.1721	1.155	.873	0.000	.919	0.000
1530	-3	20	3	2	1	.1761	0.000	0.000	0.000	0.000	0.000
1531	-4	20	3	2	1	.1833	0.000	0.000	0.000	0.000	0.000
1532	-5	20	3	2	1	.1938	0.000	0.000	0.000	0.000	0.000
1533	-6	20	3	2	1	.2074	0.000	0.000	0.000	0.000	0.000
1534	-7	20	3	1	1	.2243	.890	.838	0.000	.812	0.000
1535	-7	19	3	1	1	.2136	1.514	1.368	0.000	1.322	0.000
1536	-6	19	3	1	1	.1967	2.251	1.898	0.000	1.865	0.000
1537	-5	19	3	2	1	.1830	0.000	0.000	0.000	0.000	0.000
1538	-4	19	3	1	1	.1726	1.414	1.071	0.000	1.087	0.000
1539	-3	19	3	1	1	.1654	1.141	.836	0.000	.861	0.000
1540	-2	19	3	1	1	.1614	1.132	.814	0.000	.852	0.000
1541	-1	19	3	1	1	.1606	1.786	1.278	0.000	1.359	0.000
1542	0	19	3	2	1	.1630	0.000	0.000	0.000	0.000	0.000
1543	1	19	3	1	1	.1687	1.621	1.206	0.000	1.322	0.000
1544	2	19	3	1	1	.1776	1.167	.904	0.000	1.006	0.000
1545	3	19	3	2	1	.1897	0.000	0.000	0.000	0.000	0.000
1546	4	19	3	1	1	.2050	.864	.754	0.000	.864	0.000
1547	5	19	3	1	1	.2236	.889	.835	0.000	.971	0.000
1548	5	18	3	2	1	.2134	0.000	0.000	0.000	0.000	0.000
1549	4	18	3	1	1	.1949	.850	.711	0.000	.807	0.000
1550	3	18	3	2	1	.1795	0.000	0.000	0.000	0.000	0.000
1551	2	18	3	2	1	.1674	0.000	0.000	0.000	0.000	0.000
1552	1	18	3	2	1	.1585	0.000	0.000	0.000	0.000	0.000
1553	0	18	3	1	1	.1529	1.927	1.327	1.788	1.424	1.965
1554	-1	18	3	2	1	.1504	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1555	-2	18	3	2	1	.1512	0.000	0.000	0.000	0.000	0.000
1556	-3	18	3	1	1	.1552	1.580	1.101	.992	1.130	1.095
1557	-4	18	3	1	1	.1624	.802	.579	0.000	.586	0.000
1558	-5	18	3	2	1	.1729	0.000	0.000	0.000	0.000	0.000
1559	-6	18	3	2	1	.1866	0.000	0.000	0.000	0.000	0.000
1560	-7	18	3	2	1	.2034	0.000	0.000	0.000	0.000	0.000
1561	-8	18	3	1	1	.2236	1.536	1.444	0.000	1.373	0.000
1562	-8	17	3	1	1	.2139	2.143	1.939	0.000	1.843	0.000
1563	-7	17	3	1	1	.1938	1.467	1.221	0.000	1.178	0.000
1564	-6	17	3	2	1	.1769	0.000	0.000	0.000	0.000	0.000
1565	-5	17	3	1	1	.1633	2.408	1.746	0.000	1.734	0.000
1566	-4	17	3	2	1	.1528	0.000	0.000	0.000	0.000	0.000
1567	-3	17	3	1	1	.1456	1.097	.728	1.297	.744	1.428
1568	-2	17	3	1	1	.1416	2.032	1.319	2.209	1.368	2.433
1569	-1	17	3	2	1	.1408	0.000	0.000	0.000	0.000	0.000
1570	0	17	3	2	1	.1433	0.000	0.000	0.000	0.000	0.000
1571	1	17	3	2	1	.1489	0.000	0.000	0.000	0.000	0.000
1572	2	17	3	1	1	.1578	1.776	1.254	.515	1.374	.549
1573	3	17	3	1	1	.1699	1.625	1.216	0.000	1.350	0.000
1574	4	17	3	2	1	.1852	0.000	0.000	0.000	0.000	0.000
1575	5	17	3	1	1	.2038	1.219	1.059	0.000	1.207	0.000
1576	6	16	3	1	1	.2165	.879	.804	0.000	.918	0.000
1577	5	16	3	2	1	.1947	0.000	0.000	0.000	0.000	0.000
1578	4	16	3	2	1	.1762	0.000	0.000	0.000	0.000	0.000
1579	3	16	3	2	1	.1608	0.000	0.000	0.000	0.000	0.000
1580	2	16	3	1	1	.1487	1.104	.745	1.390	.809	1.464
1581	1	16	3	1	1	.1398	.766	.493	.804	.529	.859
1582	0	16	3	1	1	.1342	2.137	1.333	2.141	1.413	2.316
1583	-1	16	3	1	1	.1317	1.301	.801	1.277	.837	1.393
1584	-2	16	3	1	1	.1325	1.845	1.140	1.822	1.177	1.998
1585	-3	16	3	1	1	.1365	2.279	1.440	2.327	1.466	2.555
1586	-4	16	3	1	1	.1437	1.336	.878	1.521	.882	1.667
1587	-5	16	3	1	1	.1542	1.365	.946	1.036	.938	1.129
1588	-6	16	3	1	1	.1679	.810	.601	0.000	.587	0.000
1589	-7	16	3	2	1	.1848	0.000	0.000	0.000	0.000	0.000
1590	-8	16	3	1	1	.2049	1.929	1.682	0.000	1.598	0.000
1591	-9	15	3	2	1	.2197	0.000	0.000	0.000	0.000	0.000
1592	-8	15	3	1	1	.1964	1.473	1.239	0.000	1.177	0.000
1593	-7	15	3	1	1	.1762	2.174	1.675	0.000	1.612	0.000
1594	-6	15	3	1	1	.1593	1.593	1.133	.139	1.106	.150
1595	-5	15	3	2	1	.1457	0.000	0.000	0.000	0.000	0.000
1596	-4	15	3	1	1	.1352	1.856	1.164	1.875	1.166	2.052

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1597	-3	15	3	1	1	.1280	1.055	.636	1.029	.645	1.126
1598	-2	15	3	1	1	.1240	.739	.435	.732	.447	.799
1599	-1	15	3	1	1	.1232	2.210	1.295	2.197	1.347	2.380
1600	0	15	3	2	1	.1257	0.000	0.000	0.000	0.000	0.000
1601	1	15	3	1	1	.1313	1.300	.798	1.271	.851	1.345
1602	2	15	3	2	1	.1402	0.000	0.000	0.000	0.000	0.000
1603	3	15	3	2	1	.1523	0.000	0.000	0.000	0.000	0.000
1604	4	15	3	2	1	.1677	0.000	0.000	0.000	0.000	0.000
1605	5	15	3	1	1	.1862	.837	.675	0.000	.754	0.000
1606	6	15	3	1	1	.2080	.868	.767	0.000	.867	0.000
1607	6	14	3	2	1	.2000	0.000	0.000	0.000	0.000	0.000
1608	5	14	3	2	1	.1782	0.000	0.000	0.000	0.000	0.000
1609	4	14	3	1	1	.1597	1.594	1.136	.065	1.244	.064
1610	3	14	3	2	1	.1444	0.000	0.000	0.000	0.000	0.000
1611	2	14	3	1	1	.1322	1.065	.657	1.050	.704	1.078
1612	1	14	3	2	1	.1234	0.000	0.000	0.000	0.000	0.000
1613	0	14	3	1	1	.1177	1.923	1.089	1.855	1.140	1.970
1614	-1	14	3	1	1	.1153	1.445	.806	1.333	.834	1.433
1615	-2	14	3	1	1	.1160	1.774	.995	1.661	1.017	1.800
1616	-3	14	3	1	1	.1200	.732	.421	.736	.425	.802
1617	-4	14	3	1	1	.1273	2.104	1.262	2.058	1.260	2.247
1618	-5	14	3	2	1	.1377	0.000	0.000	0.000	0.000	0.000
1619	-6	14	3	2	1	.1514	0.000	0.000	0.000	0.000	0.000
1620	-7	14	3	1	1	.1683	1.812	1.345	0.000	1.294	0.000
1621	-8	14	3	2	1	.1884	0.000	0.000	0.000	0.000	0.000
1622	-9	14	3	1	1	.2117	2.136	1.916	0.000	1.796	0.000
1623	-9	13	3	1	1	.2043	1.927	1.677	0.000	1.573	0.000
1624	-8	13	3	1	1	.1810	1.174	.924	0.000	.877	0.000
1625	-7	13	3	1	1	.1608	1.131	.811	0.000	.779	0.000
1626	-6	13	3	2	1	.1440	0.000	0.000	0.000	0.000	0.000
1627	-5	13	3	2	1	.1303	0.000	0.000	0.000	0.000	0.000
1628	-4	13	3	1	1	.1198	1.265	.726	1.268	.723	1.380
1629	-3	13	3	1	1	.1126	1.242	.682	1.091	.686	1.183
1630	-2	13	3	1	1	.1086	1.420	.759	1.169	.773	1.258
1631	-1	13	3	1	1	.1078	1.226	.653	1.002	.671	1.067
1632	0	13	3	2	1	.1103	0.000	0.000	0.000	0.000	0.000
1633	1	13	3	1	1	.1159	.725	.406	.677	.427	.700
1634	2	13	3	2	1	.1248	0.000	0.000	0.000	0.000	0.000
1635	3	13	3	2	1	.1369	0.000	0.000	0.000	0.000	0.000
1636	4	13	3	2	1	.1523	0.000	0.000	0.000	0.000	0.000
1637	5	13	3	1	1	.1708	1.409	1.059	0.000	1.161	0.000
1638	6	13	3	1	1	.1926	2.391	1.980	0.000	2.193	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1639	7	13	3	1	1	.2176	2.917	2.678	0.000	2.994	0.000
1640	7	12	3	1	1	.2107	2.302	2.056	0.000	2.274	0.000
1641	6	12	3	1	1	.1857	1.183	.951	0.000	1.042	0.000
1642	5	12	3	1	1	.1640	.804	.585	0.000	.635	0.000
1643	4	12	3	1	1	.1454	1.897	1.257	2.235	1.352	2.110
1644	3	12	3	1	1	.1301	.750	.457	.725	.487	.705
1645	2	12	3	1	1	.1180	3.252	1.846	3.153	1.947	3.144
1646	1	12	3	1	1	.1091	2.010	1.078	1.662	1.126	1.695
1647	0	12	3	1	1	.1034	1.565	.808	1.224	.836	1.272
1648	-1	12	3	2	1	.1010	0.000	0.000	0.000	0.000	0.000
1649	-2	12	3	1	1	.1017	1.206	.616	.927	.624	.991
1650	-3	12	3	2	1	.1057	0.000	0.000	0.000	0.000	0.000
1651	-4	12	3	2	1	.1130	0.000	0.000	0.000	0.000	0.000
1652	-5	12	3	2	1	.1234	0.000	0.000	0.000	0.000	0.000
1653	-6	12	3	1	1	.1371	2.012	1.275	2.064	1.238	2.240
1654	-7	12	3	2	1	.1540	0.000	0.000	0.000	0.000	0.000
1655	-8	12	3	1	1	.1741	.820	.625	0.000	.594	0.000
1656	-9	12	3	1	1	.1974	2.088	1.765	0.000	1.657	0.000
1657	-10	12	3	1	1	.2240	2.176	2.048	0.000	1.901	0.000
1658	-10	11	3	2	1	.2177	0.000	0.000	0.000	0.000	0.000
1659	-9	11	3	1	1	.1911	2.066	1.701	0.000	1.598	0.000
1660	-8	11	3	2	1	.1678	0.000	0.000	0.000	0.000	0.000
1661	-7	11	3	1	1	.1477	1.556	1.043	1.918	1.001	2.075
1662	-6	11	3	2	1	.1308	0.000	0.000	0.000	0.000	0.000
1663	-5	11	3	2	1	.1171	0.000	0.000	0.000	0.000	0.000
1664	-4	11	3	2	1	.1066	0.000	0.000	0.000	0.000	0.000
1665	-3	11	3	1	1	.0994	1.384	.695	1.048	.695	1.123
1666	-2	11	3	1	1	.0954	.968	.473	.748	.477	.792
1667	-1	11	3	1	1	.0946	1.181	.574	.915	.584	.956
1668	0	11	3	1	1	.0971	1.190	.588	.912	.604	.936
1669	1	11	3	1	1	.1027	1.562	.803	1.214	.833	1.220
1670	2	11	3	2	1	.1116	0.000	0.000	0.000	0.000	0.000
1671	3	11	3	2	1	.1237	0.000	0.000	0.000	0.000	0.000
1672	4	11	3	2	1	.1391	0.000	0.000	0.000	0.000	0.000
1673	5	11	3	2	1	.1576	0.000	0.000	0.000	0.000	0.000
1674	6	11	3	1	1	.1794	1.431	1.118	0.000	1.213	0.000
1675	7	11	3	1	1	.2044	1.492	1.299	0.000	1.420	0.000
1676	7	10	3	1	1	.1986	2.092	1.778	0.000	1.923	0.000
1677	6	10	3	1	1	.1736	2.005	1.526	0.000	1.638	0.000
1678	5	10	3	2	1	.1519	0.000	0.000	0.000	0.000	0.000
1679	4	10	3	1	1	.1333	1.068	.663	1.062	.700	.963
1680	3	10	3	1	1	.1180	1.030	.585	.999	.613	.936

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1681	2	10	3	2	1	.1059	0.000	0.000	0.000	0.000	0.000
1682	1	10	3	1	1	.0970	2.278	1.125	1.747	1.160	1.731
1683	0	10	3	2	1	.0913	0.000	0.000	0.000	0.000	0.000
1684	-1	10	3	2	1	.0889	0.000	0.000	0.000	0.000	0.000
1685	-2	10	3	1	1	.0896	2.125	.995	1.672	.999	1.756
1686	-3	10	3	1	1	.0937	.963	.464	.750	.462	.797
1687	-4	10	3	1	1	.1009	1.390	.705	1.059	.696	1.137
1688	-5	10	3	1	1	.1113	1.430	.778	1.225	.761	1.322
1689	-6	10	3	2	1	.1250	0.000	0.000	0.000	0.000	0.000
1690	-7	10	3	1	1	.1419	1.331	.866	1.456	.830	1.575
1691	-8	10	3	2	1	.1620	0.000	0.000	0.000	0.000	0.000
1692	-9	10	3	1	1	.1853	1.446	1.160	0.000	1.091	0.000
1693	-10	10	3	2	1	.2119	0.000	0.000	0.000	0.000	0.000
1694	-10	9	3	1	1	.2067	.866	.761	0.000	.709	0.000
1695	-9	9	3	1	1	.1801	1.433	1.123	0.000	1.057	0.000
1696	-8	9	3	1	1	.1568	1.585	1.113	.672	1.057	.725
1697	-7	9	3	1	1	.1367	1.802	1.139	1.842	1.092	1.991
1698	-6	9	3	2	1	.1198	0.000	0.000	0.000	0.000	0.000
1699	-5	9	3	1	1	.1061	1.221	.642	.980	.626	1.054
1700	-4	9	3	1	1	.0957	2.053	1.004	1.584	.988	1.690
1701	-3	9	3	1	1	.0884	1.770	.821	1.375	.814	1.450
1702	-2	9	3	1	1	.0844	2.381	1.072	1.772	1.071	1.842
1703	-1	9	3	1	1	.0836	1.742	.779	1.285	.786	1.313
1704	0	9	3	2	1	.0861	0.000	0.000	0.000	0.000	0.000
1705	1	9	3	1	1	.0918	1.013	.482	.794	.493	.775
1706	2	9	3	1	1	.1006	1.040	.527	.791	.544	.750
1707	3	9	3	1	1	.1128	1.522	.836	1.340	.869	1.232
1708	4	9	3	1	1	.1281	.746	.450	.727	.471	.646
1709	5	9	3	1	1	.1466	1.553	1.036	1.876	1.093	1.604
1710	6	9	3	2	1	.1684	0.000	0.000	0.000	0.000	0.000
1711	7	9	3	2	1	.1934	0.000	0.000	0.000	0.000	0.000
1712	8	9	3	2	1	.2216	0.000	0.000	0.000	0.000	0.000
1713	8	8	3	1	1	.2170	1.757	1.609	0.000	1.713	0.000
1714	7	8	3	2	1	.1888	0.000	0.000	0.000	0.000	0.000
1715	6	8	3	2	1	.1637	0.000	0.000	0.000	0.000	0.000
1716	5	8	3	2	1	.1420	0.000	0.000	0.000	0.000	0.000
1717	4	8	3	2	1	.1234	0.000	0.000	0.000	0.000	0.000
1718	3	8	3	2	1	.1081	0.000	0.000	0.000	0.000	0.000
1719	2	8	3	1	1	.0960	2.824	1.385	2.176	1.419	2.027
1720	1	8	3	1	1	.0871	.998	.458	.764	.466	.733
1721	0	8	3	1	1	.0814	4.714	2.072	3.392	2.093	3.343
1722	-1	8	3	1	1	.0790	.918	.396	.651	.397	.656

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1723	-2	8	3	1	1	.0798	2.517	1.092	1.783	1.087	1.834
1724	-3	8	3	1	1	.0838	2.466	1.104	1.821	1.091	1.904
1725	-4	8	3	1	1	.0910	1.509	.713	1.187	.699	1.258
1726	-5	8	3	1	1	.1014	2.201	1.122	1.687	1.091	1.805
1727	-6	8	3	2	1	.1151	0.000	0.000	0.000	0.000	0.000
1728	-7	8	3	1	1	.1320	1.302	.802	1.280	.768	1.382
1729	-8	8	3	1	1	.1521	.786	.539	.805	.512	.870
1730	-9	8	3	2	1	.1754	0.000	0.000	0.000	0.000	0.000
1731	-10	8	3	1	1	.2020	1.717	1.480	0.000	1.382	0.000
1732	-10	7	3	1	1	.1979	.854	.723	0.000	.676	0.000
1733	-9	7	3	2	1	.1713	0.000	0.000	0.000	0.000	0.000
1734	-8	7	3	2	1	.1480	0.000	0.000	0.000	0.000	0.000
1735	-7	7	3	1	1	.1279	2.235	1.345	2.181	1.287	2.350
1736	-6	7	3	1	1	.1110	1.012	.549	.860	.530	.923
1737	-5	7	3	1	1	.0973	2.574	1.274	1.970	1.237	2.095
1738	-4	7	3	1	1	.0869	1.489	.683	1.137	.667	1.196
1739	-3	7	3	1	1	.0796	2.832	1.227	2.006	1.208	2.078
1740	-2	7	3	2	1	.0756	0.000	0.000	0.000	0.000	0.000
1741	-1	7	3	1	1	.0749	1.277	.533	.909	.531	.905
1742	0	7	3	2	1	.0773	0.000	0.000	0.000	0.000	0.000
1743	4	7	3	2	1	.1193	0.000	0.000	0.000	0.000	0.000
1744	1	7	3	1	1	.0830	1.138	.506	.833	.512	.786
1745	2	7	3	1	1	.0918	1.353	.644	1.061	.655	.970
1746	3	7	3	1	1	.1040	.993	.515	.780	.527	.689
1747	5	7	3	2	1	.1378	0.000	0.000	0.000	0.000	0.000
1748	6	7	3	1	1	.1596	2.642	1.883	.131	1.960	.102
1749	7	7	3	1	1	.1846	1.444	1.155	0.000	1.209	0.000
1750	8	7	3	1	1	.2129	1.746	1.573	0.000	1.656	0.000
1751	8	6	3	1	1	.2093	1.503	1.335	0.000	1.389	0.000
1752	7	6	3	2	1	.1811	0.000	0.000	0.000	0.000	0.000
1753	6	6	3	1	1	.1561	3.357	2.350	1.741	2.422	1.321
1754	5	6	3	2	1	.1343	0.000	0.000	0.000	0.000	0.000
1755	4	6	3	2	1	.1157	0.000	0.000	0.000	0.000	0.000
1756	3	6	3	2	1	.1004	0.000	0.000	0.000	0.000	0.000
1757	2	6	3	1	1	.0883	1.496	.693	1.160	.700	1.040
1758	1	6	3	1	1	.0794	2.429	1.051	1.721	1.055	1.596
1759	0	6	3	2	1	.0737	0.000	0.000	0.000	0.000	0.000
1760	-1	6	3	1	1	.0713	3.726	1.509	2.657	1.498	2.608
1761	-2	6	3	1	1	.0721	1.787	.728	1.274	.719	1.280
1762	-3	6	3	1	1	.0761	2.313	.974	1.644	.956	1.686
1763	-4	6	3	1	1	.0833	.659	.294	.484	.287	.505
1764	-5	6	3	1	1	.0937	2.152	1.038	1.674	1.006	1.769

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1765	-6	6	3	1	1	.1074	1.415	.751	1.151	.723	1.229
1766	-7	6	3	1	1	.1243	1.477	.871	1.462	.833	1.571
1767	-8	6	3	1	1	.1444	1.728	1.139	1.995	1.082	2.151
1768	-9	6	3	1	1	.1678	1.810	1.341	0.000	1.265	0.000
1769	-10	6	3	1	1	.1943	1.696	1.415	0.000	1.325	0.000
1770	-11	6	3	2	1	.2241	0.000	0.000	0.000	0.000	0.000
1771	-11	5	3	1	1	.2211	1.531	1.424	0.000	1.328	0.000
1772	-10	5	3	1	1	.1913	2.668	2.197	0.000	2.062	0.000
1773	-9	5	3	1	1	.1647	1.393	1.017	0.000	.961	0.000
1774	-8	5	3	2	1	.1414	0.000	0.000	0.000	0.000	0.000
1775	-7	5	3	1	1	.1213	3.440	1.992	3.443	1.905	3.685
1776	-6	5	3	1	1	.1044	11.007	5.723	8.691	5.503	9.224
1777	-5	5	3	1	1	.0907	1.906	.899	1.502	.870	1.575
1778	-4	5	3	1	1	.0803	1.456	.634	1.034	.617	1.068
1779	-3	5	3	1	1	.0730	1.794	.737	1.278	.721	1.296
1780	-2	5	3	1	1	.0690	1.396	.555	.967	.545	.959
1781	-1	5	3	1	1	.0683	1.867	.737	1.262	.728	1.221
1782	0	5	3	2	1	.0707	0.000	0.000	0.000	0.000	0.000
1783	1	5	3	1	1	.0764	1.436	.606	1.021	.605	.929
1784	2	5	3	1	1	.0853	1.752	.793	1.315	.795	1.156
1785	3	5	3	1	1	.0974	.689	.341	.527	.344	.446
1786	4	5	3	1	1	.1127	.719	.395	.632	.399	.512
1787	5	5	3	1	1	.1313	1.679	1.030	1.641	1.047	1.271
1788	6	5	3	2	1	.1530	0.000	0.000	0.000	0.000	0.000
1789	7	5	3	2	1	.1780	0.000	0.000	0.000	0.000	0.000
1790	8	5	3	1	1	.2063	.865	.759	0.000	.781	0.000
1791	8	4	3	1	1	.2038	1.722	1.495	0.000	1.520	0.000
1792	7	4	3	2	1	.1756	0.000	0.000	0.000	0.000	0.000
1793	6	4	3	1	1	.1506	1.591	1.083	1.941	1.094	1.392
1794	5	4	3	1	1	.1288	2.277	1.378	2.213	1.387	1.670
1795	4	4	3	2	1	.1102	0.000	0.000	0.000	0.000	0.000
1796	3	4	3	1	1	.0949	2.195	1.068	1.699	1.067	1.404
1797	2	4	3	1	1	.0828	3.950	1.755	2.886	1.748	2.483
1798	1	4	3	2	1	.0739	0.000	0.000	0.000	0.000	0.000
1799	0	4	3	1	1	.0682	2.098	.828	1.417	.818	1.309
1800	-1	4	3	1	1	.0658	1.253	.484	.781	.476	.744
1801	-2	4	3	1	1	.0666	2.739	1.065	1.753	1.043	1.715
1802	-3	4	3	1	1	.0706	2.709	1.090	1.932	1.063	1.936
1803	-4	4	3	1	1	.0778	.656	.280	.466	.272	.476
1804	-5	4	3	2	1	.0882	0.000	0.000	0.000	0.000	0.000
1805	-6	4	3	1	1	.1019	1.002	.512	.772	.492	.814
1806	-7	4	3	2	1	.1188	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1807	-8	4	3	2	1	.1389	0.000	0.000	0.000	0.000	0.000
1808	-9	4	3	2	1	.1623	C.000	0.000	0.000	0.000	0.000
1809	-10	4	3	1	1	.1888	1.708	1.392	0.000	1.308	0.000
1810	-11	4	3	2	1	.2186	C.000	0.000	0.000	0.000	0.000
1811	-11	3	3	2	1	.2167	0.000	0.000	0.000	0.000	0.000
1812	-10	3	3	1	1	.1869	1.234	.997	0.000	.939	0.000
1813	-9	3	3	1	1	.1603	2.882	2.060	0.000	1.950	0.000
1814	-8	3	3	1	1	.1370	2.967	1.880	3.041	1.788	3.253
1815	-7	3	3	1	1	.1169	2.000	1.128	1.902	1.077	2.017
1816	-6	3	3	1	1	.1000	2.043	1.031	1.543	.989	1.616
1817	-5	3	3	2	1	.0863	0.000	0.000	0.000	0.000	0.000
1818	-4	3	3	2	1	.0759	0.000	0.000	0.000	0.000	0.000
1819	-3	3	3	1	1	.0686	1.592	.630	1.089	.612	1.077
1820	-2	3	3	1	1	.0646	3.836	1.467	2.302	1.430	2.220
1821	-1	3	3	1	1	.0639	2.297	.872	1.342	.854	1.257
1822	0	3	3	2	1	.0663	0.000	0.000	0.000	0.000	0.000
1823	1	3	3	2	1	.0720	0.000	0.000	0.000	0.000	0.000
1824	2	3	3	2	1	.0809	0.000	0.000	0.000	0.000	0.000
1825	3	3	3	1	1	.0930	.707	.339	.552	.336	.445
1826	4	3	3	1	1	.1083	1.654	.883	1.357	.878	1.046
1827	5	3	3	1	1	.1269	1.550	.928	1.519	.925	1.115
1828	6	3	3	1	1	.1486	1.991	1.342	2.501	1.342	1.742
1829	7	3	3	2	1	.1736	0.000	0.000	0.000	0.000	0.000
1830	8	3	3	1	1	.2019	2.367	2.039	0.000	2.049	0.000
1831	8	2	3	2	1	.2005	0.000	0.000	0.000	0.000	0.000
1832	7	2	3	1	1	.1723	3.403	2.574	0.000	2.555	0.000
1833	6	2	3	1	1	.1473	1.405	.940	1.718	.931	1.161
1834	5	2	3	1	1	.1255	.772	.458	.760	.453	.543
1835	4	2	3	1	1	.1069	4.482	2.370	3.629	2.339	2.725
1836	3	2	3	2	1	.0916	0.00C	0.000	0.000	0.000	0.000
1837	2	2	3	1	1	.0795	1.791	.775	1.269	.761	1.044
1838	1	2	3	1	1	.0706	.926	.373	.660	.365	.566
1839	0	2	3	2	1	.0649	0.000	0.000	0.000	0.000	0.000
1840	-1	2	3	1	1	.0625	2.761	1.036	1.537	1.009	1.415
1841	-2	2	3	1	1	.0633	2.201	.831	1.260	.808	1.197
1842	-3	2	3	2	1	.0673	0.000	0.000	0.000	0.000	0.000
1843	-4	2	3	1	1	.0745	.664	.276	.473	.267	.473
1844	-5	2	3	1	1	.0849	2.926	1.322	2.189	1.272	2.236
1845	-6	2	3	2	1	.0986	0.00C	0.000	0.000	0.000	0.000
1846	-7	2	3	1	1	.1155	1.065	.595	.987	.569	1.041
1847	-8	2	3	1	1	.1356	1.768	1.111	1.791	1.057	1.909
1848	-9	2	3	1	1	.1590	.829	.589	.115	.558	.123

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1849	-10	2	3	2	1	.1855	0.000	0.000	0.000	0.000	0.000
1850	-11	2	3	1	1	.2153	.913	.831	0.000	.781	0.000
1851	-11	1	3	1	1	.2145	3.290	2.983	0.000	2.812	0.000
1852	-10	1	3	1	1	.1847	3.791	3.034	0.000	2.869	0.000
1853	-9	1	3	1	1	.1581	1.171	.828	.289	.786	.309
1854	-8	1	3	2	1	.1348	0.000	0.000	0.000	0.000	0.000
1855	-7	1	3	1	1	.1147	2.127	1.182	1.942	1.129	2.033
1856	-6	1	3	1	1	.0978	.717	.356	.548	.341	.565
1857	-5	1	3	1	1	.0841	3.299	1.481	2.446	1.422	2.472
1858	-4	1	3	1	1	.0737	1.326	.548	.944	.527	.933
1859	-3	1	3	1	1	.0664	1.821	.707	1.161	.683	1.118
1860	-2	1	3	1	1	.0624	.895	.335	.497	.325	.465
1861	-1	1	3	1	1	.0617	2.361	.879	1.275	.853	1.154
1862	0	1	3	2	1	.0641	0.000	0.000	0.000	0.000	0.000
1863	1	1	3	1	1	.0698	.652	.261	.462	.254	.388
1864	2	1	3	1	1	.0787	1.351	.581	.958	.567	.770
1865	3	1	3	2	1	.0908	0.000	0.000	0.000	0.000	0.000
1866	4	1	3	1	1	.1061	1.644	.865	1.320	.846	.965
1867	5	1	3	2	1	.1247	0.000	0.000	0.000	0.000	0.000
1868	6	1	3	2	1	.1464	0.000	0.000	0.000	0.000	0.000
1869	7	1	3	2	1	.1714	0.000	0.000	0.000	0.000	0.000
1870	8	1	3	1	1	.1997	2.676	2.283	0.000	2.244	0.000
1871	7	0	3	1	2	.1712	3.797	2.021	0.000	1.964	0.000
1872	5	0	3	1	2	.1244	4.872	2.032	3.409	1.973	2.294
1873	3	0	3	1	2	.0905	2.221	.740	1.238	.717	.926
1874	1	0	3	1	2	.0695	2.351	.663	1.168	.642	.958
1875	-1	0	3	1	2	.0614	4.412	1.159	1.668	1.119	1.481
1876	-3	0	3	2	2	.0662	0.000	0.000	0.000	0.000	0.000
1877	-5	0	3	1	2	.0838	3.765	1.192	1.968	1.143	1.966
1878	-7	0	3	1	2	.1144	1.504	.590	.966	.563	1.004
1879	-9	0	3	2	2	.1579	0.000	0.000	0.000	0.000	0.000
1880	-11	0	3	2	2	.2142	0.000	0.000	0.000	0.000	0.000
1881	-10	0	4	2	2	.2205	0.000	0.000	0.000	0.000	0.000
1882	-8	0	4	1	2	.1734	4.747	2.552	0.000	2.387	0.000
1883	-6	0	4	1	2	.1390	2.252	1.020	1.659	.959	1.535
1884	-4	0	4	2	2	.1176	0.000	0.000	0.000	0.000	0.000
1885	-2	0	4	2	2	.1091	0.000	0.000	0.000	0.000	0.000
1886	0	0	4	1	2	.1135	2.999	1.170	1.893	1.115	1.355
1887	2	0	4	2	2	.1307	0.000	0.000	0.000	0.000	0.000
1888	4	0	4	1	2	.1609	1.444	.732	0.000	.701	0.000
1889	6	0	4	1	2	.2039	2.839	1.744	0.000	1.673	0.000
1890	6	1	4	1	1	.2042	4.017	3.494	0.000	3.391	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1891	5	1	4	1	1	.1811	1.221	.962	0.000	.932	0.000
1892	4	1	4	1	1	.1612	1.444	1.037	0.000	1.003	0.000
1893	3	1	4	2	1	.1445	0.000	0.000	0.000	0.000	0.000
1894	2	1	4	2	1	.1310	0.000	0.000	0.000	0.000	0.000
1895	1	1	4	2	1	.1208	0.000	0.000	0.000	0.000	0.000
1896	0	1	4	1	1	.1138	2.906	1.606	2.608	1.541	1.919
1897	-1	1	4	1	1	.1100	1.965	1.060	1.639	1.014	1.266
1898	-2	1	4	1	1	.1094	3.782	2.033	3.137	1.940	2.538
1899	-3	1	4	2	1	.1120	0.000	0.000	0.000	0.000	0.000
1900	-4	1	4	1	1	.1179	1.314	.746	1.273	.707	1.118
1901	-5	1	4	1	1	.1270	1.343	.805	1.316	.761	1.197
1902	-6	1	4	1	1	.1393	.796	.511	.832	.482	.782
1903	-7	1	4	1	1	.1549	2.177	1.515	1.464	1.424	1.417
1904	-8	1	4	1	1	.1736	1.706	1.299	0.000	1.216	0.000
1905	-9	1	4	1	1	.1956	2.343	1.966	0.000	1.834	0.000
1906	-10	1	4	1	1	.2208	.921	.856	0.000	.796	0.000
1907	-10	2	4	2	1	.2216	0.000	0.000	0.000	0.000	0.000
1908	-9	2	4	1	1	.1964	1.775	1.494	0.000	1.395	0.000
1909	-8	2	4	1	1	.1745	3.417	2.611	0.000	2.448	0.000
1910	-7	2	4	2	1	.1557	0.000	0.000	0.000	0.000	0.000
1911	-6	2	4	1	1	.1401	2.112	1.361	2.225	1.287	2.124
1912	-5	2	4	1	1	.1278	1.737	1.045	1.695	.992	1.569
1913	-4	2	4	2	1	.1187	0.000	0.000	0.000	0.000	0.000
1914	-3	2	4	2	1	.1129	0.000	0.000	0.000	0.000	0.000
1915	-2	2	4	2	1	.1102	0.000	0.000	0.000	0.000	0.000
1916	-1	2	4	2	1	.1108	0.000	0.000	0.000	0.000	0.000
1917	0	2	4	1	1	.1146	.751	.417	.685	.403	.517
1918	1	2	4	2	1	.1216	0.000	0.000	0.000	0.000	0.000
1919	2	2	4	2	1	.1318	0.000	0.000	0.000	0.000	0.000
1920	3	2	4	2	1	.1453	0.000	0.000	0.000	0.000	0.000
1921	4	2	4	2	1	.1620	0.000	0.000	0.000	0.000	0.000
1922	5	2	4	2	1	.1819	0.000	0.000	0.000	0.000	0.000
1923	6	2	4	1	1	.2050	2.011	1.755	0.000	1.723	0.000
1924	6	3	4	1	1	.2064	2.016	1.769	0.000	1.757	0.000
1925	5	3	4	2	1	.1833	0.000	0.000	0.000	0.000	0.000
1926	4	3	4	1	1	.1634	1.674	1.214	0.000	1.199	0.000
1927	3	3	4	1	1	.1467	1.983	1.323	2.396	1.301	1.589
1928	2	3	4	2	1	.1332	0.000	0.000	0.000	0.000	0.000
1929	1	3	4	1	1	.1230	.767	.449	.763	.438	.564
1930	0	3	4	1	1	.1160	.754	.423	.705	.411	.546
1931	-1	3	4	2	1	.1122	0.000	0.000	0.000	0.000	0.000
1932	-2	3	4	1	1	.1116	2.474	1.349	2.130	1.302	1.803

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1933	-3	3	4	1	1	.1142	1.503	.833	1.361	.801	1.197
1934	-4	3	4	2	1	.1201	0.000	0.000	0.000	0.000	0.000
1935	-5	3	4	1	1	.1292	1.101	.668	1.068	.636	1.006
1936	-6	3	4	2	1	.1415	0.000	0.000	0.000	0.000	0.000
1937	-7	3	4	1	1	.1571	2.480	1.745	.960	1.646	.954
1938	-8	3	4	1	1	.1758	2.097	1.613	0.000	1.514	0.000
1939	-9	3	4	2	1	.1978	0.000	0.000	0.000	0.000	0.000
1940	-10	3	4	1	1	.2230	2.774	2.601	0.000	2.417	0.000
1941	-9	4	4	1	1	.1997	1.784	1.523	0.000	1.424	0.000
1942	-8	4	4	2	1	.1778	0.000	0.000	0.000	0.000	0.000
1943	-7	4	4	2	1	.1590	0.000	0.000	0.000	0.000	0.000
1944	-6	4	4	2	1	.1434	0.000	0.000	0.000	0.000	0.000
1945	-5	4	4	2	1	.1311	0.000	0.000	0.000	0.000	0.000
1946	-4	4	4	1	1	.1220	2.026	1.179	2.023	1.133	1.877
1947	-3	4	4	1	1	.1162	.754	.423	.708	.409	.635
1948	-2	4	4	1	1	.1135	.749	.413	.669	.401	.579
1949	-1	4	4	1	1	.1141	2.253	1.248	2.034	1.217	1.690
1950	0	4	4	1	1	.1179	1.314	.745	1.272	.731	1.012
1951	1	4	4	2	1	.1249	0.000	0.000	0.000	0.000	0.000
1952	2	4	4	2	1	.1351	0.000	0.000	0.000	0.000	0.000
1953	3	4	4	1	1	.1486	1.817	1.225	2.281	1.216	1.560
1954	4	4	4	2	1	.1653	0.000	0.000	0.000	0.000	0.000
1955	5	4	4	1	1	.1852	1.230	.986	0.000	.987	0.000
1956	6	4	4	2	1	.2083	0.000	0.000	0.000	0.000	0.000
1957	6	5	4	2	1	.2108	0.000	0.000	0.000	0.000	0.000
1958	5	5	4	1	1	.1877	2.623	2.126	0.000	2.152	0.000
1959	4	5	4	1	1	.1677	2.532	1.875	0.000	1.889	0.000
1960	3	5	4	2	1	.1511	0.000	0.000	0.000	0.000	0.000
1961	2	5	4	1	1	.1376	2.382	1.514	2.454	1.510	1.820
1962	1	5	4	2	1	.1274	0.000	0.000	0.000	0.000	0.000
1963	0	5	4	2	1	.1203	0.000	0.000	0.000	0.000	0.000
1964	-1	5	4	1	1	.1166	3.544	1.994	3.350	1.958	2.846
1965	-2	5	4	2	1	.1160	0.000	0.000	0.000	0.000	0.000
1966	-3	5	4	1	1	.1186	1.073	.612	1.053	.594	.963
1967	-4	5	4	1	1	.1245	1.336	.788	1.321	.761	1.247
1968	-5	5	4	1	1	.1336	1.574	.979	1.569	.939	1.524
1969	-6	5	4	1	1	.1459	2.138	1.421	2.545	1.355	2.534
1970	-7	5	4	2	1	.1615	0.000	0.000	0.000	0.000	0.000
1971	-8	5	4	1	1	.1802	2.114	1.658	0.000	1.561	0.000
1972	-9	5	4	1	1	.2022	2.002	1.727	0.000	1.615	0.000
1973	-9	6	4	2	1	.2052	0.000	0.000	0.000	0.000	0.000
1974	-8	6	4	1	1	.1832	1.226	.975	0.000	.919	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
1975	-7	6	4	2	1	.1645	0.000	0.000	0.000	0.000	0.000
1976	-6	6	4	1	1	.1489	1.819	1.228	2.299	1.174	2.317
1977	-5	6	4	1	1	.1366	2.240	1.416	2.289	1.364	2.255
1978	-4	6	4	1	1	.1275	.775	.466	.758	.452	.727
1979	-3	6	4	1	1	.1217	1.081	.628	1.081	.612	1.006
1980	-2	6	4	2	1	.1190	0.000	0.000	0.000	0.000	0.000
1981	-1	6	4	2	1	.1196	0.000	0.000	0.000	0.000	0.000
1982	0	6	4	1	1	.1234	1.332	.781	1.323	.777	1.104
1983	1	6	4	1	1	.1304	1.747	1.067	1.695	1.067	1.354
1984	2	6	4	1	1	.1406	1.385	.895	1.475	.901	1.124
1985	3	6	4	1	1	.1541	1.838	1.274	1.419	1.289	1.029
1986	4	6	4	2	1	.1708	0.000	0.000	0.000	0.000	0.000
1987	5	6	4	1	1	.1907	1.241	1.020	0.000	1.044	0.000
1988	6	6	4	1	1	.2138	1.288	1.165	0.000	1.199	0.000
1989	6	7	4	1	1	.2174	1.834	1.682	0.000	1.751	0.000
1990	5	7	4	1	1	.1943	2.652	2.212	0.000	2.289	0.000
1991	4	7	4	1	1	.1743	1.709	1.305	0.000	1.342	0.000
1992	3	7	4	2	1	.1577	0.000	0.000	0.000	0.000	0.000
1993	2	7	4	1	1	.1442	1.611	1.061	1.852	1.077	1.450
1994	1	7	4	1	1	.1340	1.365	.850	1.365	.858	1.117
1995	0	7	4	2	1	.1269	0.000	0.000	0.000	0.000	0.000
1996	-1	7	4	1	1	.1231	.767	.449	.763	.447	.676
1997	-2	7	4	1	1	.1226	3.757	2.193	3.743	2.167	3.435
1998	-3	7	4	1	1	.1252	.771	.457	.761	.448	.720
1999	-4	7	4	1	1	.1311	1.917	1.175	1.871	1.144	1.822
2000	-5	7	4	1	1	.1402	2.112	1.361	2.228	1.316	2.224
2001	-6	7	4	2	1	.1525	0.000	0.000	0.000	0.000	0.000
2002	-7	7	4	2	1	.1681	0.000	0.000	0.000	0.000	0.000
2003	-8	7	4	1	1	.1868	2.309	1.865	0.000	1.761	0.000
2004	-9	7	4	2	1	.2088	0.000	0.000	0.000	0.000	0.000
2005	-9	8	4	2	1	.2129	0.000	0.000	0.000	0.000	0.000
2006	-8	8	4	2	1	.1909	0.000	0.000	0.000	0.000	0.000
2007	-7	8	4	2	1	.1722	0.000	0.000	0.000	0.000	0.000
2008	-6	8	4	2	1	.1566	0.000	0.000	0.000	0.000	0.000
2009	-5	8	4	2	1	.1443	0.000	0.000	0.000	0.000	0.000
2010	-4	8	4	2	1	.1352	0.000	0.000	0.000	0.000	0.000
2011	-3	8	4	1	1	.1293	1.559	.946	1.512	.933	1.456
2012	-2	8	4	1	1	.1267	1.094	.654	1.073	.650	1.003
2013	-1	8	4	2	1	.1273	0.000	0.000	0.000	0.000	0.000
2014	0	8	4	1	1	.1311	.782	.479	.763	.484	.665
2015	1	8	4	1	1	.1381	1.123	.716	1.161	.728	.974
2016	2	8	4	2	1	.1483	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
2017	3	8	4	2	1	.1618	0.000	0.000	0.000	0.000	0.000
2018	4	8	4	2	1	.1785	0.000	0.000	0.000	0.000	0.000
2019	5	8	4	2	1	.1984	0.000	0.000	0.000	0.000	0.000
2020	6	8	4	2	1	.2215	0.000	0.000	0.000	0.000	0.000
2021	5	9	4	2	1	.2030	0.000	0.000	0.000	0.000	0.000
2022	4	9	4	2	1	.1831	0.000	0.000	0.000	0.000	0.000
2023	3	9	4	1	1	.1665	1.882	1.386	0.000	1.444	0.000
2024	2	9	4	1	1	.1530	1.421	.980	1.297	1.013	1.068
2025	1	9	4	1	1	.1428	.802	.524	.894	.537	.767
2026	0	9	4	1	1	.1357	1.937	1.218	1.964	1.239	1.750
2027	-1	9	4	1	1	.1319	1.753	1.080	1.723	1.089	1.589
2028	-2	9	4	1	1	.1314	2.349	1.442	2.298	1.442	2.186
2029	-3	9	4	1	1	.1340	1.576	.982	1.576	.973	1.541
2030	-4	9	4	2	1	.1399	0.000	0.000	0.000	0.000	0.000
2031	-5	9	4	1	1	.1490	1.410	.952	1.783	.927	1.825
2032	-6	9	4	1	1	.1613	.833	.598	0.000	.577	0.000
2033	-7	9	4	2	1	.1769	0.000	0.000	0.000	0.000	0.000
2034	-8	9	4	2	1	.1956	0.000	0.000	0.000	0.000	0.000
2035	-9	9	4	2	1	.2176	0.000	0.000	0.000	0.000	0.000
2036	-9	10	4	1	1	.2228	1.306	1.224	0.000	1.149	0.000
2037	-8	10	4	1	1	.2008	2.363	2.027	0.000	1.923	0.000
2038	-7	10	4	1	1	.1821	1.936	1.531	0.000	1.468	0.000
2039	-6	10	4	2	1	.1665	0.000	0.000	0.000	0.000	0.000
2040	-5	10	4	1	1	.1542	1.838	1.275	1.390	1.246	1.439
2041	-4	10	4	1	1	.1451	.806	.533	.944	.527	.959
2042	-3	10	4	2	1	.1392	0.000	0.000	0.000	0.000	0.000
2043	-2	10	4	1	1	.1366	1.373	.868	1.403	.873	1.357
2044	-1	10	4	2	1	.1372	0.000	0.000	0.000	0.000	0.000
2045	0	10	4	2	1	.1410	0.000	0.000	0.000	0.000	0.000
2046	1	10	4	1	1	.1480	1.988	1.335	2.466	1.381	2.164
2047	2	10	4	2	1	.1582	0.000	0.000	0.000	0.000	0.000
2048	3	10	4	2	1	.1717	0.000	0.000	0.000	0.000	0.000
2049	4	10	4	1	1	.1884	1.957	1.592	0.000	1.689	0.000
2050	5	10	4	2	1	.2083	0.000	0.000	0.000	0.000	0.000
2051	5	11	4	1	1	.2140	.911	.825	0.000	.893	0.000
2052	4	11	4	2	1	.1941	0.000	0.000	0.000	0.000	0.000
2053	3	11	4	1	1	.1774	1.718	1.331	0.000	1.414	0.000
2054	2	11	4	1	1	.1640	1.184	.861	0.000	.907	0.000
2055	1	11	4	1	1	.1537	1.836	1.271	1.499	1.325	1.344
2056	0	11	4	1	1	.1467	1.983	1.323	2.399	1.366	2.226
2057	-1	11	4	1	1	.1429	1.796	1.175	2.010	1.201	1.923
2058	-2	11	4	2	1	.1424	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
2059	-3	11	4	1	1	.1450	2.420	1.601	2.829	1.604	2.849
2060	-4	11	4	2	1	.1509	0.000	0.000	0.000	0.000	0.000
2061	-5	11	4	1	1	.1600	2.351	1.678	.005	1.647	.005
2062	-6	11	4	1	1	.1723	.850	.643	0.000	.625	0.000
2063	-7	11	4	1	1	.1878	1.236	1.002	0.000	.963	0.000
2064	-8	11	4	1	1	.2066	1.274	1.119	0.000	1.064	0.000
2065	-8	12	4	1	1	.2129	1.822	1.642	0.000	1.563	0.000
2066	-7	12	4	2	1	.1942	0.000	0.000	0.000	0.000	0.000
2067	-6	12	4	2	1	.1786	0.000	0.000	0.000	0.000	0.000
2068	-5	12	4	1	1	.1663	1.458	1.073	0.000	1.057	0.000
2069	-4	12	4	1	1	.1572	1.654	1.165	.609	1.161	.633
2070	-3	12	4	2	1	.1513	0.000	0.000	0.000	0.000	0.000
2071	-2	12	4	1	1	.1487	1.409	.950	1.772	.967	1.769
2072	-1	12	4	1	1	.1493	2.442	1.651	3.105	1.700	3.021
2073	0	12	4	2	1	.1530	0.000	0.000	0.000	0.000	0.000
2074	1	12	4	1	1	.1601	.831	.593	0.000	.624	0.000
2075	2	12	4	2	1	.1703	0.000	0.000	0.000	0.000	0.000
2076	3	12	4	1	1	.1838	1.942	1.548	0.000	1.661	0.000
2077	4	12	4	1	1	.2005	2.362	2.022	0.000	2.192	0.000
2078	5	12	4	2	1	.2204	0.000	0.000	0.000	0.000	0.000
2079	4	13	4	2	1	.2073	0.000	0.000	0.000	0.000	0.000
2080	3	13	4	1	1	.1906	.878	.721	0.000	.781	0.000
2081	2	13	4	2	1	.1772	0.000	0.000	0.000	0.000	0.000
2082	1	13	4	2	1	.1669	0.000	0.000	0.000	0.000	0.000
2083	0	13	4	2	1	.1599	0.000	0.000	0.000	0.000	0.000
2084	-1	13	4	2	1	.1561	0.000	0.000	0.000	0.000	0.000
2085	-2	13	4	2	1	.1556	0.000	0.000	0.000	0.000	0.000
2086	-3	13	4	1	1	.1582	.828	.586	.197	.593	.203
2087	-4	13	4	2	1	.1641	0.000	0.000	0.000	0.000	0.000
2088	-5	13	4	2	1	.1732	0.000	0.000	0.000	0.000	0.000
2089	-6	13	4	1	1	.1855	.870	.699	0.000	.683	0.000
2090	-7	13	4	1	1	.2010	2.189	1.879	0.000	1.815	0.000
2091	-8	13	4	1	1	.2198	1.841	1.705	0.000	1.626	0.000
2092	-7	14	4	2	1	.2085	0.000	0.000	0.000	0.000	0.000
2093	-6	14	4	1	1	.1929	.881	.731	0.000	.717	0.000
2094	-5	14	4	2	1	.1806	0.000	0.000	0.000	0.000	0.000
2095	-4	14	4	1	1	.1715	1.900	1.432	0.000	1.441	0.000
2096	-3	14	4	2	1	.1656	0.000	0.000	0.000	0.000	0.000
2097	-2	14	4	1	1	.1630	1.449	1.049	0.000	1.083	0.000
2098	-1	14	4	1	1	.1635	.836	.607	0.000	.634	0.000
2099	0	14	4	2	1	.1673	0.000	0.000	0.000	0.000	0.000
2100	1	14	4	1	1	.1744	.853	.652	0.000	.697	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
2101	2	14	4	1	1	.1846	1.740	1.392	0.000	1.506	0.000
2102	3	14	4	1	1	.1981	1.779	1.508	0.000	1.651	0.000
2103	4	14	4	1	1	.2147	1.290	1.171	0.000	1.297	0.000
2104	4	15	4	2	1	.2227	0.000	0.000	0.000	0.000	0.000
2105	3	15	4	1	1	.2060	1.273	1.115	0.000	1.233	0.000
2106	2	15	4	2	1	.1926	0.000	0.000	0.000	0.000	0.000
2107	1	15	4	1	1	.1823	1.224	.969	0.000	1.045	0.000
2108	0	15	4	1	1	.1753	1.711	1.313	0.000	1.399	0.000
2109	-1	15	4	2	1	.1715	0.000	0.000	0.000	0.000	0.000
2110	-2	15	4	1	1	.1709	2.400	1.804	0.000	1.873	0.000
2111	-3	15	4	2	1	.1736	0.000	0.000	0.000	0.000	0.000
2112	-4	15	4	1	1	.1795	1.724	1.348	0.000	1.363	0.000
2113	-5	15	4	1	1	.1886	2.476	2.015	0.000	2.010	0.000
2114	-6	15	4	1	1	.2009	1.998	1.714	0.000	1.687	0.000
2115	-7	15	4	1	1	.2164	1.587	1.450	0.000	1.408	0.000
2116	-6	16	4	1	1	.2094	.905	.804	0.000	.794	0.000
2117	-5	16	4	2	1	.1971	0.000	0.000	0.000	0.000	0.000
2118	-4	16	4	2	1	.1880	0.000	0.000	0.000	0.000	0.000
2119	-3	16	4	2	1	.1821	0.000	0.000	0.000	0.000	0.000
2120	-2	16	4	2	1	.1795	0.000	0.000	0.000	0.000	0.000
2121	-1	16	4	1	1	.1800	1.726	1.353	0.000	1.433	0.000
2122	0	16	4	2	1	.1838	0.000	0.000	0.000	0.000	0.000
2123	1	16	4	1	1	.1908	1.242	1.021	0.000	1.111	0.000
2124	2	16	4	1	1	.2011	2.364	2.030	0.000	2.238	0.000
2125	3	16	4	2	1	.2145	0.000	0.000	0.000	0.000	0.000
2126	3	17	4	1	1	.2236	1.604	1.507	0.000	1.701	0.000
2127	2	17	4	2	1	.2102	0.000	0.000	0.000	0.000	0.000
2128	1	17	4	2	1	.1999	0.000	0.000	0.000	0.000	0.000
2129	0	17	4	1	1	.1929	1.764	1.463	0.000	1.583	0.000
2130	-1	17	4	1	1	.1891	3.035	2.476	0.000	2.642	0.000
2131	-2	17	4	1	1	.1885	1.517	1.235	0.000	1.299	0.000
2132	-3	17	4	1	1	.1912	.879	.723	0.000	.750	0.000
2133	-4	17	4	2	1	.1971	0.000	0.000	0.000	0.000	0.000
2134	-5	17	4	2	1	.2062	0.000	0.000	0.000	0.000	0.000
2135	-6	17	4	2	1	.2185	0.000	0.000	0.000	0.000	0.000
2136	-5	18	4	2	1	.2158	0.000	0.000	0.000	0.000	0.000
2137	-4	18	4	1	1	.2067	2.706	2.377	0.000	2.440	0.000
2138	-3	18	4	2	1	.2008	0.000	0.000	0.000	0.000	0.000
2139	-2	18	4	1	1	.1981	1.542	1.308	0.000	1.384	0.000
2140	-1	18	4	1	1	.1987	1.781	1.514	0.000	1.627	0.000
2141	0	18	4	2	1	.2025	0.000	0.000	0.000	0.000	0.000
2142	1	18	4	2	1	.2095	0.000	0.000	0.000	0.000	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
2143	2	18	4	1	1	.2198	1.841	1.704	0.000	1.915	0.000
2144	1	19	4	1	1	.2197	.919	.851	0.000	.950	0.000
2145	0	19	4	1	1	.2127	2.574	2.317	0.000	2.548	0.000
2146	-1	19	4	2	1	.2089	0.000	0.000	0.000	0.000	0.000
2147	-2	19	4	1	1	.2083	.903	.799	0.000	.851	0.000
2148	-3	19	4	1	1	.2110	2.401	2.147	0.000	2.251	0.000
2149	-4	19	4	2	1	.2168	0.000	0.000	0.000	0.000	0.000
2150	-3	20	4	1	1	.2217	1.599	1.492	0.000	1.574	0.000
2151	-2	20	4	1	1	.2190	2.251	2.078	0.000	2.229	0.000
2152	-1	20	4	1	1	.2196	2.601	2.407	0.000	2.625	0.000
2153	0	20	4	1	1	.2234	1.603	1.506	0.000	1.670	0.000
2154	-2	14	5	2	1	.2241	0.000	0.000	0.000	0.000	0.000
2155	-4	13	5	2	1	.2225	0.000	0.000	0.000	0.000	0.000
2156	-3	13	5	1	1	.2180	3.178	2.922	0.000	2.968	0.000
2157	-2	13	5	1	1	.2167	1.832	1.676	0.000	1.723	0.000
2158	-1	13	5	1	1	.2186	.918	.846	0.000	.880	0.000
2159	0	13	5	2	1	.2238	0.000	0.000	0.000	0.000	0.000
2160	0	12	5	2	1	.2169	0.000	0.000	0.000	0.000	0.000
2161	-1	12	5	2	1	.2117	0.000	0.000	0.000	0.000	0.000
2162	-2	12	5	2	1	.2098	0.000	0.000	0.000	0.000	0.000
2163	-3	12	5	2	1	.2111	0.000	0.000	0.000	0.000	0.000
2164	-4	12	5	1	1	.2156	2.585	2.355	0.000	2.347	0.000
2165	-5	12	5	2	1	.2234	0.000	0.000	0.000	0.000	0.000
2166	-5	11	5	1	1	.2171	.916	.839	0.000	.822	0.000
2167	-4	11	5	2	1	.2093	0.000	0.000	0.000	0.000	0.000
2168	-3	11	5	1	1	.2048	.898	.783	0.000	.784	0.000
2169	-2	11	5	2	1	.2035	0.000	0.000	0.000	0.000	0.000
2170	-1	11	5	2	1	.2054	0.000	0.000	0.000	0.000	0.000
2171	0	11	5	1	1	.2106	1.815	1.620	0.000	1.673	0.000
2172	1	11	5	1	1	.2189	.918	.847	0.000	.884	0.000
2173	1	10	5	2	1	.2132	0.000	0.000	0.000	0.000	0.000
2174	0	10	5	1	1	.2048	.898	.783	0.000	.801	0.000
2175	-1	10	5	1	1	.1996	3.089	2.636	0.000	2.671	0.000
2176	-2	10	5	2	1	.1977	0.000	0.000	0.000	0.000	0.000
2177	-3	10	5	1	1	.1990	1.992	1.695	0.000	1.685	0.000
2178	-4	10	5	2	1	.2035	0.000	0.000	0.000	0.000	0.000
2179	-5	10	5	2	1	.2113	0.000	0.000	0.000	0.000	0.000
2180	-6	10	5	2	1	.2223	0.000	0.000	0.000	0.000	0.000
2181	-6	9	5	2	1	.2170	0.000	0.000	0.000	0.000	0.000
2182	-5	9	5	2	1	.2061	0.000	0.000	0.000	0.000	0.000
2183	-4	9	5	2	1	.1983	0.000	0.000	0.000	0.000	0.000
2184	-3	9	5	1	1	.1938	2.336	1.945	0.000	1.919	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
2185	-2	9	5	1	1	.1925	2.159	1.787	0.000	1.779	0.000
2186	-1	9	5	2	1	.1944	0.000	0.000	0.000	0.000	0.000
2187	0	9	5	2	1	.1996	0.000	0.000	0.000	0.000	0.000
2188	1	9	5	2	1	.2079	0.000	0.000	0.000	0.000	0.000
2189	2	9	5	1	1	.2195	1.300	1.202	0.000	1.239	0.000
2190	2	8	5	1	1	.2149	2.042	1.855	0.000	1.892	0.000
2191	1	8	5	2	1	.2033	0.000	0.000	0.000	0.000	0.000
2192	0	8	5	2	1	.1949	0.000	0.000	0.000	0.000	0.000
2193	-1	8	5	1	1	.1898	2.481	2.029	0.000	2.022	0.000
2194	-2	8	5	1	1	.1878	1.516	1.230	0.000	1.215	0.000
2195	-3	8	5	2	1	.1891	0.000	0.000	0.000	0.000	0.000
2196	-4	8	5	1	1	.1936	2.497	2.077	0.000	2.018	0.000
2197	-5	8	5	2	1	.2014	0.000	0.000	0.000	0.000	0.000
2198	-6	8	5	2	1	.2124	0.000	0.000	0.000	0.000	0.000
2199	-7	7	5	2	1	.2224	0.000	0.000	0.000	0.000	0.000
2200	-6	7	5	2	1	.2082	0.000	0.000	0.000	0.000	0.000
2201	-5	7	5	2	1	.1973	0.000	0.000	0.000	0.000	0.000
2202	-4	7	5	2	1	.1895	0.000	0.000	0.000	0.000	0.000
2203	-3	7	5	1	1	.1850	2.611	2.092	0.000	2.036	0.000
2204	-2	7	5	1	1	.1837	1.227	.977	0.000	.958	0.000
2205	-1	7	5	1	1	.1856	1.231	.989	0.000	.977	0.000
2206	0	7	5	1	1	.1908	1.965	1.615	0.000	1.607	0.000
2207	1	7	5	1	1	.1991	1.259	1.072	0.000	1.074	0.000
2208	2	7	5	1	1	.2107	1.816	1.622	0.000	1.637	0.000
2209	3	6	5	1	1	.2220	2.064	1.928	0.000	1.937	0.000
2210	2	6	5	1	1	.2072	1.564	1.377	0.000	1.375	0.000
2211	1	6	5	1	1	.1956	2.170	1.820	0.000	1.806	0.000
2212	0	6	5	1	1	.1872	2.311	1.869	0.000	1.843	0.000
2213	-1	6	5	1	1	.1821	1.501	1.187	0.000	1.162	0.000
2214	-2	6	5	1	1	.1801	2.113	1.657	0.000	1.612	0.000
2215	-3	6	5	1	1	.1814	1.499	1.182	0.000	1.142	0.000
2216	-4	6	5	1	1	.1860	3.698	2.975	0.000	2.855	0.000
2217	-5	6	5	1	1	.1937	.882	.734	0.000	.699	0.000
2218	-6	6	5	1	1	.2047	1.798	1.567	0.000	1.482	0.000
2219	-7	6	5	1	1	.2189	.918	.847	0.000	.795	0.000
2220	-7	5	5	1	1	.2158	1.830	1.668	0.000	1.560	0.000
2221	-6	5	5	2	1	.2016	0.000	0.000	0.000	0.000	0.000
2222	-5	5	5	1	1	.1907	1.758	1.444	0.000	1.368	0.000
2223	-4	5	5	1	1	.1829	.866	.688	0.000	.656	0.000
2224	-3	5	5	2	1	.1784	0.000	0.000	0.000	0.000	0.000
2225	-2	5	5	2	1	.1771	0.000	0.000	0.000	0.000	0.000
2226	-1	5	5	1	1	.1790	.860	.671	0.000	.652	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
2227	0	5	5	2	1	.1842	0.000	0.000	0.000	0.000	0.000
2228	1	5	5	1	1	.1925	1.245	1.031	0.000	1.013	0.000
2229	2	5	5	1	1	.2041	2.376	2.066	0.000	2.041	0.000
2230	3	5	5	1	1	.2190	1.298	1.198	0.000	1.190	0.000
2231	3	4	5	1	1	.2165	1.832	1.674	0.000	1.644	0.000
2232	2	4	5	1	1	.2017	2.001	1.722	0.000	1.683	0.000
2233	1	4	5	1	1	.1901	.877	.718	0.000	.699	0.000
2234	0	4	5	1	1	.1817	.864	.683	0.000	.661	0.000
2235	-1	4	5	2	1	.1766	0.000	0.000	0.000	0.000	0.000
2236	-2	4	5	1	1	.1746	1.709	1.307	0.000	1.253	0.000
2237	-3	4	5	1	1	.1759	.856	.658	0.000	.627	0.000
2238	-4	4	5	1	1	.1805	2.990	2.348	0.000	2.226	0.000
2239	-5	4	5	1	1	.1882	1.750	1.422	0.000	1.341	0.000
2240	-6	4	5	1	1	.1992	1.259	1.072	0.000	1.005	0.000
2241	-7	4	5	2	1	.2134	0.000	0.000	0.000	0.000	0.000
2242	-7	3	5	2	1	.2114	0.000	0.000	0.000	0.000	0.000
2243	-6	3	5	2	1	.1972	0.000	0.000	0.000	0.000	0.000
2244	-5	3	5	1	1	.1863	.871	.702	0.000	.658	0.000
2245	-4	3	5	1	1	.1785	1.721	1.340	0.000	1.262	0.000
2246	-3	3	5	1	1	.1740	1.206	.920	0.000	.871	0.000
2247	-2	3	5	1	1	.1727	1.476	1.119	0.000	1.064	0.000
2248	-1	3	5	1	1	.1746	2.093	1.601	0.000	1.529	0.000
2249	0	3	5	2	1	.1798	0.000	0.000	0.000	0.000	0.000
2250	1	3	5	2	1	.1881	0.000	0.000	0.000	0.000	0.000
2251	2	3	5	1	1	.1997	3.215	2.745	0.000	2.656	0.000
2252	3	3	5	1	1	.2146	.912	.827	0.000	.804	0.000
2253	3	2	5	1	1	.2132	2.576	2.323	0.000	2.232	0.000
2254	2	2	5	2	1	.1984	0.000	0.000	0.000	0.000	0.000
2255	1	2	5	1	1	.1868	2.138	1.726	0.000	1.648	0.000
2256	0	2	5	1	1	.1784	1.924	1.497	0.000	1.423	0.000
2257	-1	2	5	1	1	.1733	.852	.647	0.000	.613	0.000
2258	-2	2	5	1	1	.1713	1.200	.904	0.000	.853	0.000
2259	-3	2	5	1	1	.1726	2.085	1.580	0.000	1.486	0.000
2260	-4	2	5	1	1	.1772	2.102	1.626	0.000	1.523	0.000
2261	-5	2	5	1	1	.1849	1.741	1.394	0.000	1.300	0.000
2262	-6	2	5	1	1	.1959	2.344	1.969	0.000	1.828	0.000
2263	-7	2	5	2	1	.2101	0.000	0.000	0.000	0.000	0.000
2264	-7	1	5	1	1	.2092	.905	.803	0.000	.739	0.000
2265	-6	1	5	1	1	.1950	1.534	1.284	0.000	1.187	0.000
2266	-5	1	5	1	1	.1841	3.009	2.402	0.000	2.228	0.000
2267	-4	1	5	1	1	.1763	.856	.660	0.000	.614	0.000
2268	-3	1	5	1	1	.1718	2.551	1.926	0.000	1.799	0.000

SERIAL NO.	H	K	L	JCODE	EPSILON	S2T/L2	FREL	/E1/	/E2/	/E3/	/E4/
2269	-2	1	5	1	1	.1705	1.470	1.103	0.000	1.034	0.000
2270	-1	1	5	2	1	.1724	0.000	0.000	0.000	0.000	0.000
2271	0	1	5	1	1	.1776	1.716	1.332	0.000	1.256	0.000
2272	1	1	5	2	1	.1860	0.000	0.000	0.000	0.000	0.000
2273	2	1	5	2	1	.1975	0.000	0.000	0.000	0.000	0.000
2274	3	1	5	2	1	.2124	0.000	0.000	0.000	0.000	0.000
2275	3	0	5	1	2	.2121	2.227	1.414	0.000	1.329	0.000
2276	1	0	5	1	2	.1857	2.463	1.400	0.000	1.311	0.000
2277	-1	0	5	1	2	.1722	.850	.454	0.000	.424	0.000
2278	-3	0	5	1	2	.1715	2.687	1.433	0.000	1.329	0.000
2279	-5	0	5	1	2	.1838	1.227	.692	0.000	.630	0.000
2280	-7	0	5	1	2	.2090	4.340	2.721	0.000	2.497	0.000